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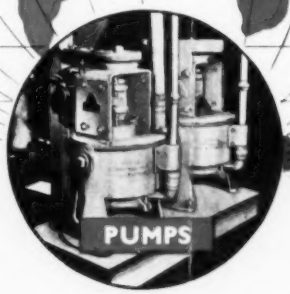

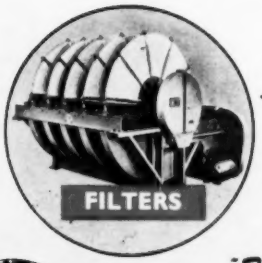

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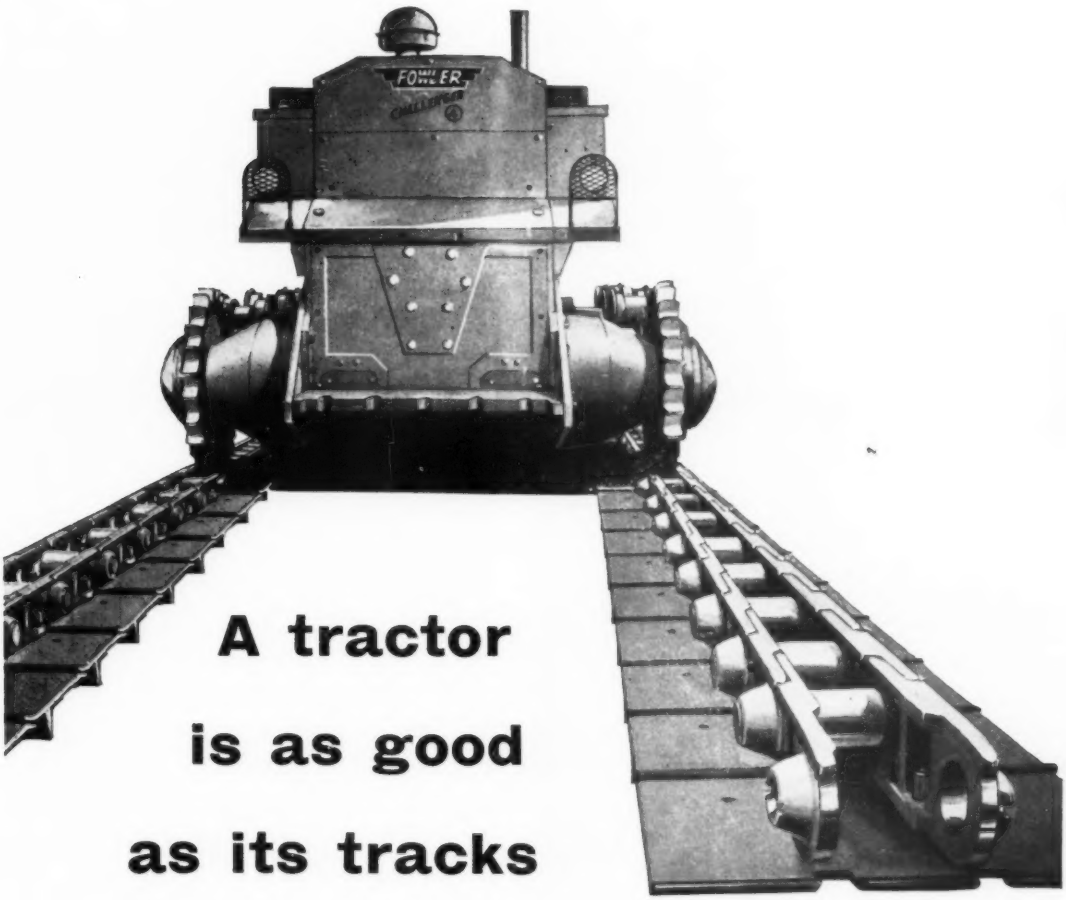

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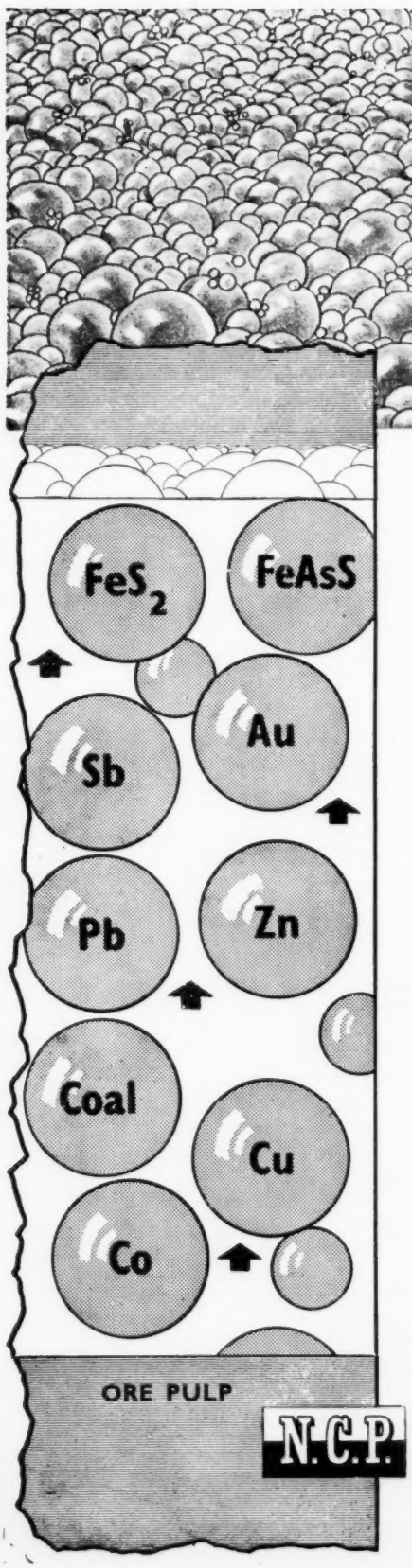

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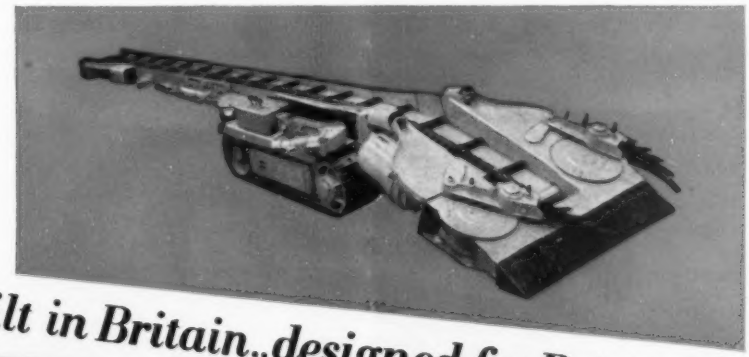

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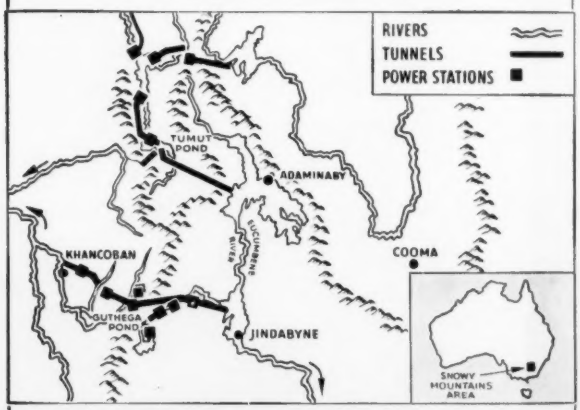
ATLAS COPCO EQUIPMENT IN ACTION AS GIANT SNOWY MOUNTAINS SCHEME GETS UNDER WAY

Guthega power house near completion. It is providing the first water power from the Snowy Mountains scheme.



The scheme is one of the biggest power and irrigation projects ever undertaken in the world.

25 YEARS TO COMPLETE

The Australian Alps, south-west of Canberra, are the location of one of the biggest power and irrigation projects ever undertaken in the world. It is the Snowy Mountains scheme, expected to take 25 years and £A 422,000,000 to complete.

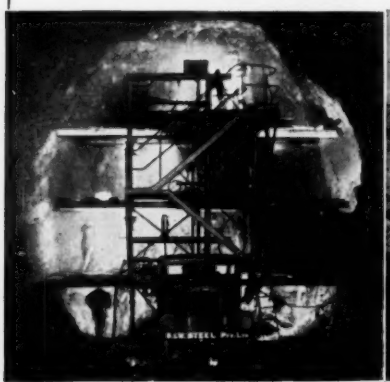
On the eastern slopes of the highest mountain in this 100-mile range, the Snowy River rises and then flows down to the south-east coast. Eventually this river will flow *westwards* to provide 2 million acre feet of water a year for irrigation and power stations with a total generating capacity of 3 million kilowatts.

85 MILES OF TUNNELLING

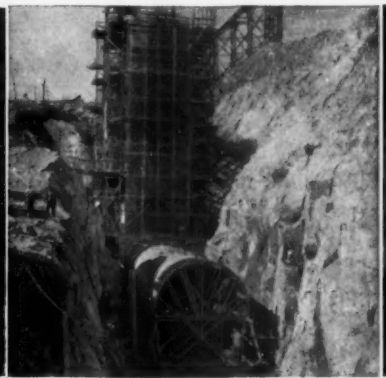
The Snowy Mountains scheme is engineering on a massive scale. It involves the construction of 7 major dams, 10 smaller ones, 85 miles of tunnels, 17 power stations (most of them underground), 400 miles of aqueducts, numerous shafts ranging up to 1,100 feet in depth, and hundreds of miles of mountain roads and access tracks. From the beginning, Atlas Copco rock drills, Atlas Copco air compressors and Sandvik Coromant drill steels are being widely used on many of these operations.

ATLAS COPCO PREPARE THE WAY

The first major stage of the scheme, the Guthega hydro-electric project consisting of a 100-ft. dam, a 3½-mile tunnel and a power station, has already been completed and is providing the first water power from the scheme. Atlas Copco rock drills fitted with Sandvik Coromant drill steels were chosen for the tunnels and all other rock excavations. This drilling unit was also at work building miles of mountain roads to prepare the way for the contractors, the Selmer Engineering Company of Norway.



Tunnelling at Adaminaby Dam diversion tunnel from jumbos, mobile drilling platforms pioneered by Atlas Copco.



Intake structure for the 3½-mile Guthega tunnel driven by Atlas Copco drills fitted with Sandvik Coromant steels.

Bottom of a shaft drilled by Atlas Copco drills and Sandvik Coromant steels on the Adaminaby diversion tunnel.

From the start, Atlas Copco drilling equipment has been widely used on the Snowy Mountains scheme.

Atlas Copco drills fitted with Sandvik Coromant drill steels in action in the Guthega tunnel, the first major stage of the scheme.

BATTERY OF TEN ATLAS COPCO COMPRESSORS SUPPLIES POWER FOR 14-MILE TUNNEL

Atlas Copco equipment is also in action on the second stage of the Snowy Mountains scheme. The main contractors are the American group, Kaiser-Walsh-Perini-Raymond. On the Eucumbene-Tumut project Atlas Copco rock drills and Sandvik Coromant drill steels are widely used for various drilling operations, for example, drilling a 4,000 feet access tunnel into the main tunnel. Here, the rock drills are fed by Atlas Copco portable compressors. And at the main tunnel a battery of ten Atlas Copco AR4E compressors is the main power source for all drilling operations. A number of Atlas Copco AR3 compressors are also used by the Australian contractors, Allied Construction Pty. Ltd., on the diversion tunnel to Adaminaby Dam.

Over the past ten years, Atlas Copco light rock drills and Sandvik Coromant drill steels have become the world's most widely-used drilling combination. They were developed together and are *working together*, turning projects like the Snowy Mountains scheme into reality all over the world.

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For further technical information about Atlas Copco Equipment write to the most convenient of the addresses given here:

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Readers in countries outside those listed above and who do not know the name of their local Atlas Copco company or agent, please write to Atlas Copco AB, Stockholm 1, Sweden.

Battery of ten Atlas Copco AR 4E compressors installed at the junction shaft of the 14-mile Eucumbene-Tumut tunnel

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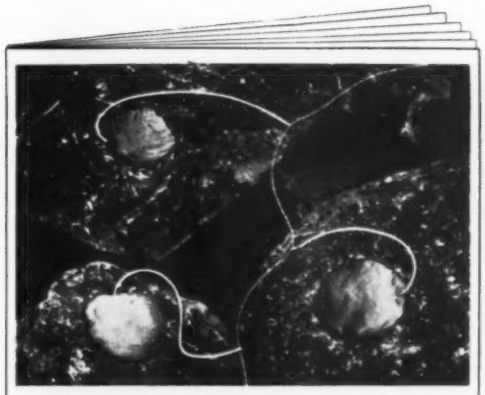

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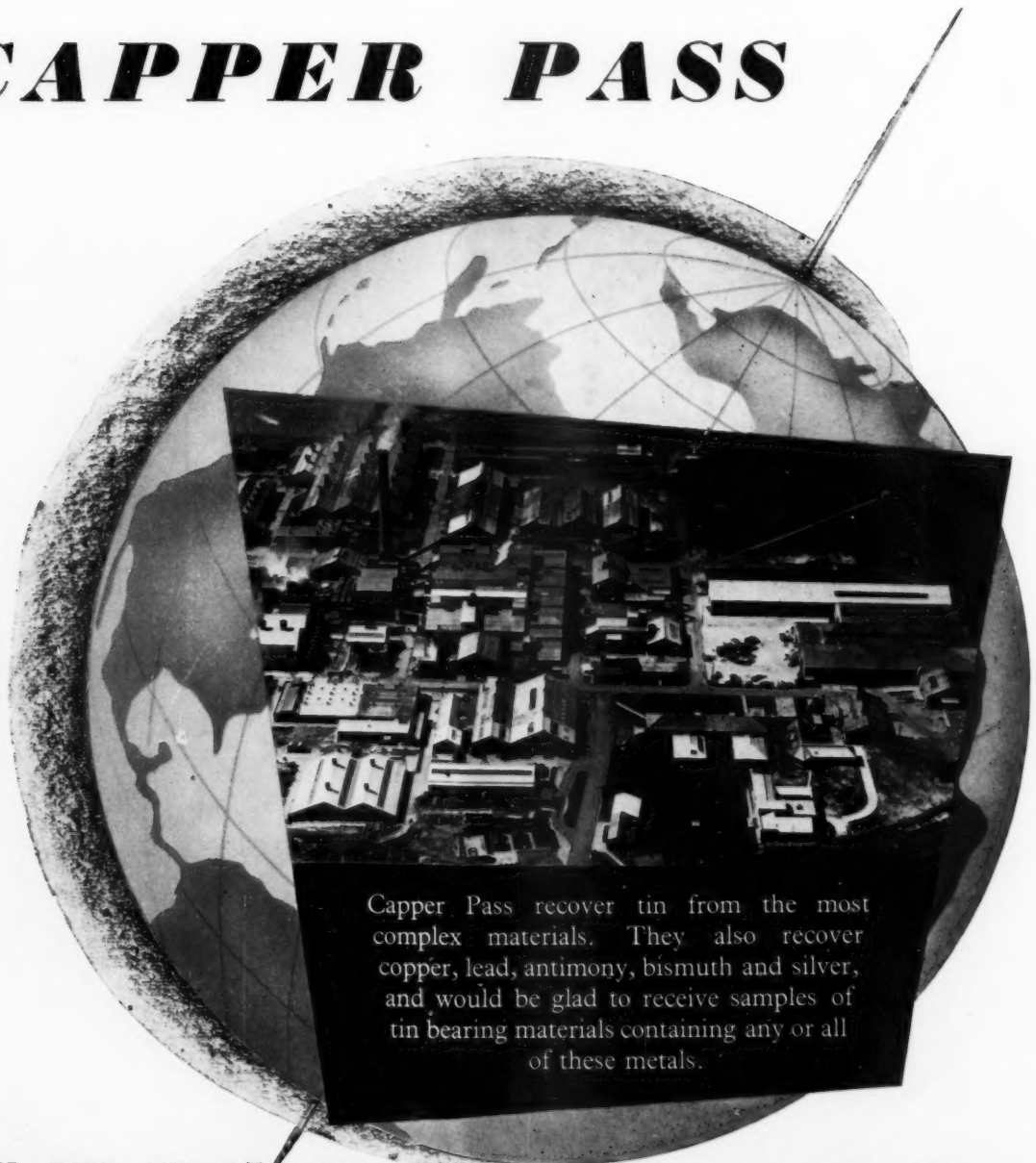

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The Mining Journal

Established 1835

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NOTES AND COMMENTS

South Africa's Need for U.K. Investment Capital

Recently a good deal of hope has been centred around a possible revival in the gold share market. We have, in fact, repeatedly voiced in these columns our opinion that the cumulative effect of influences such as the threat of declining industrial activity in the West, coupled with growing earnings and dividends from the Orange Free State goldfield, must eventually combine to tip the balance of attention towards the attractive investment opportunities which exist in the South African gold mining industry.

During the past week events have, in fact, demonstrated that this for long unpopular section of the market might be starting to regain some of its former attraction. Yet, what might be described as this " better feeling " is by no means premature—least of all from South Africa's point of view. Following the enumeration by Sir Ernest Oppenheimer in his statement to Anglo American shareholders of the widely accepted deterrents which have recently caused a flight of British capital away from the Union (to which he added the comment that world competition for capital funds had seldom been more intense), the Prime Minister of South Africa, Mr. Strijdom, has made some further important observations on this serious problem which have been well received in market circles. Besides this, speaking as President of the Transvaal and Orange Free State Chamber of Mines, Mr. B. L. Bernstein—a well known leader of the industry—had added his views to what has become a most topical point of discussion.

Although Mr. Strijdom is primarily a politician, and his statements in the U.K. at the present time must therefore be strongly influenced by a wish to convince the Commonwealth Conference of his country's goodwill, it was encouraging to hear him deny that South Africa was drifting into a policy of isolation towards the rest of the world, and more particularly towards the Commonwealth. Emphatically assuring those present at the South African Club dinner held earlier this week that the ultimate establishment of a republican form of government would in no way affect the country's co-operation with the U.K. and other Commonwealth countries, he stated that well informed businessmen, industrialists, bankers and financiers who had invested vast sums in the industrial, mining and economic life of South Africa knew that this allegation of isolationism was a complete travesty of the truth. Quite apart from common defence problems, economic and finance interests were so interwoven that it was of the utmost importance that trade and other economic relations should expand and be strengthened wherever possible.

Referring to the progress of South Africa's industry and agriculture, Mr. Strijdom recalled that since 1946 the national income had expanded from £649,000,000 to £1,457,000,000 in 1955 and emphasized that this growth would not have been possible without a high rate of capital investment to which U.K. investors had made a considerable contribution. He expressed his hope that this country would be able to continue to play its traditional role of capital provider.

It is not, however, surprising that Mr. Strijdom found it necessary to make this comment, for his government is known to have been extremely anxious for some time about the reduction in private investment from abroad. Indeed, the contrast between a net influx of £55,000,000 during 1954 compared with a net outflow of £3,000,000 during 1955 demonstrated the seriousness of the matter. South Africa's reserves of gold and foreign exchange had, of course, suffered severe falls under these conditions.

Lacking the political flavour of Mr. Strijdom's speech, the views on capital supplies to South Africa which Mr. Bernstein expressed in his Presidential statement to the Transvaal and O.F.S. Chamber of Mines were perhaps of still greater significance. In agreeing with Mr. Strijdom that the Union could not maintain its economic momentum in isolation and independent of overseas capital, Mr. Bernstein stressed that South Africa must continue to be an importer of capital for many years. He subscribed to the view that the large amounts of additional capital required yearly by South Africa could not be found within the country itself and he believed that London—the traditional contributor towards South Africa's advancement—must remain the most likely future source of capital. This was not only because South Africa was part of the Sterling Area, but primarily because of the ability of London to understand investment in the Union.

While all this is undoubtedly the case, it is difficult to convince British investors that all will remain quiet on the political front and any renewed interest in gold shares

must for the present primarily reflect the desire to switch into a more active market, rather than confidence in the future of South Africa. Indeed, while the consequences of apartheid may have been over-emphasized in this country, there remains a large section of opinion which envisages the danger of sizeable labour disturbances within the Union in a very few years' time if present policies are continued. Meanwhile, the pessimists may draw some consolation from the hard economic fact that Britain and South Africa are firmly joined together as trading partners. The value of South Africa's imports from Britain last year amounted to some £167,000,000 while on the other hand Britain continued as South Africa's best customer by taking exports—including gold and diamonds—to the tune of £280,000,000. Gold sales to the U.K. last year totalled £167,000,000—after allowing for conversion of some of the proceeds into dollars—and the Union's net contribution to Sterling Area gold reserves was as much as £90,000,000.

No Encouragement for Cornish Mining

A new clause which would grant relief from income tax for the development of new metalliferous mines within the United Kingdom was recently proposed for inclusion in the Finance Bill by Mr. Douglas Marshall, M.P. for Bodmin, Cornwall. The proceedings in the House of Commons sitting in committee on this proposal on June 19 provided striking testimonial to the sincere faith Cornishmen retain in the potential richness of their mineral wealth.

Nourished on faith and hope for more than 25 years, the Cornish mining industry is too weak to get well but, supported by its two active tin producers, Geevor and South Crofty, it is too strong to die. Even so it should be emphasized that the Cornish M.P.s (all five members supported the motion) asked not for money or for subvention, but only for an opportunity to develop the mineral wealth of the United Kingdom. It is true that tax exemption was sought on the profits derived from any new mining venture for a period of three years after it had come into regular production. But as this is no more than that granted by other Commonwealth countries as well as by the U.S.A. and more recently by Eire, the request is obviously not unreasonable. Indeed the adoption of the Canadian system of mining taxation in Eire has had, as Mr. Marshall graphically described, "an immediate effect —an actual 'seeable' effect, not just something on paper" (see *M.J.*, June 8, page 706).

It would be a waste of time and space to repeat once more the arguments advanced by the Members for Cornwall to secure acceptance of this new proposal as these must be wholly familiar to readers of *The Mining Journal*. The essential point made, and ably so, was that there is sufficient agreement amongst mining men that, given a reasonable tax code applicable to the development of new mining ventures within the United Kingdom, mining companies would seriously investigate the known mineralized areas in Cornwall.

Leaving aside the question as to whether the actual value of metal extracted in Cornwall would ever measure up to Cornish estimates of their own potential mineral wealth, the argument is strong enough to stand by itself. Indeed, if minerals live in Cornwall in commercial quantities, as has so persistently been claimed, the United Kingdom and the Exchequer would benefit therefrom. If nothing eventuates neither the United Kingdom nor the Exchequer, so the argument runs, has lost anything.

While the Government's reply to the debate confirmed that official thinking on the subject of mining in this country has never progressed beyond reading and apparently rejecting the Westwood Committee's Report, it is useful to have on record the fundamental reason why successive Governments in this country continue to ignore the United Kingdom metalliferous mining industry.

Replying on behalf of the Government and referring to the tax exemption which the new proposal would secure, Sir Edward Boyle said, "Relief of this kind would mean that non-ferrous metalliferous mining concerns would be given preferential treatment, not only as compared with other kinds of mines, but as compared with industry generally, and, if a tax-free holiday were conceded to certain mining concerns, it would be extremely difficult to resist similar claims for preferential treatment for other mines, and for other sections of industry. For example, the shipping or agricultural industry might perfectly well claim that its particular importance to the national economy, or the degree of risk involved in its enterprises, entitled it to preferential treatment. Certainly claims of that nature would be made."

To view the question of risk as between shipping or agriculture and mining as a matter of degree rather than of kind must appear to mining men as an unpardonable error. But to tinge this already fallacious argument with social justice is both amoral and iniquitous.

Admittedly, the government have granted the mining industry the favourable investment allowance of 40 per cent. But unless and until our present tax code can be adjusted to provide the opportunity for mining companies to exercise their skills in uncovering the mineral wealth of this country, we shall always remain dependent on sentiment and goodwill for our supplies of valuable mineral resources.

Russian and British Engineers Exchange Ideas

The increasing contacts between British professional men and their opposite numbers in Russia was welcomed by Sir Edward Appleton, Principal and Vice-Chancellor of Edinburgh University, when he addressed the summer meeting of the Institution of Mining Engineers in Edinburgh.

Sir Edward referred to the British mining delegation which recently visited the U.S.S.R. under the leadership of Dr. William Reid, president of the Institution. This mission has already led to a return visit by a party of Russian mining engineers at the invitation of the National Coal Board. The Soviet Technical Mission arrived at London Airport on Saturday, June 16, and will stay a month to see the British coal industry in various parts of the country. The leader is Mr. F. A. Barabanov, a member of the Collegium of the Soviet Ministry for the Coal Industry (equivalent to a member of the National Coal Board).

A representative of *The Mining Journal* had an opportunity of interviewing (in the wee sma' hours) the Russian delegation in Glasgow at the end of their first day's programme, which included visits by groups to Lingerwood, Bowhill and Rothes collieries, followed by a tour of Edinburgh Castle and a reception at the Civic Chambers. The Russians expressed themselves as being greatly impressed with what they had so far seen and were convinced that both countries could benefit from the exchange of ideas and technical information.

During their visits to Scottish collieries the visitors displayed a keen interest in all forms of mechanization, but particularly in conveyor transport. Belt conveying is not extensively employed for coal in Russian mines and the Soviet Technical Mission considers that this is a field in which Britain is ahead. Much interest was also shown by the visitors in pre-stressed concrete, a material which is evidently little known to Russian engineers.

Norwegian Mineral Production in 1955

(From Our Own Correspondent)

The reports of the Norwegian state mine inspectors show a general increase in Norwegian ore production during 1955 over the previous year. This increase of output is especially pronounced for the country's main ore products, namely iron ore concentrates and cupreous and non-cupreous pyrites.

Comparable figures for the last two years reveal the following returns :

	1954		1955	
Mineral	*Producers*	*Tonnes*	*Producers*	*Tonnes*
Iron ore	7	795,946	7	1,244,995
Ilmenite	1	149,185	1	157,833
Pyrites	13	795,946	13	848,271
Cu-concentrates ...	7	27,375	7	26,779
Zn-concentrates ...	8	12,082	8	14,228
Pb-concentrates ...	2	1,124	2	1,070
Molybdenite ...	2	265	2	299
Nb-Ta-concentrates ...	1	178	1	307
Graphite	1	3,663	1	5,400
Silver ore	1	10,477	1	8,173

Twenty-five mining companies were producing in 1955. Of these, seven are iron mines which yielded 1,245,000 tonnes of ore and concentrates during the period, an increase of nearly 15 per cent over the previous output. This production came in the main from the big Sydvaranger mine. Plans are under development for the exploitation of the extensive low-grade iron ore deposits of the Dunderland valley, situated some twenty to thirty miles from the iron smelter and mills at Mo in Rana. The erection of a pilot concentrator adjacent to the smelter is being considered. Extensive iron ore deposits have been detected by the Norwegian Geological Survey in East Finmark.

One of the iron mines yielded 15,000 tons of flotation pyrites as a by-product. There are twelve pyrite mines in Norway, producing cupreous and non-cupreous pyrites together with copper and zinc concentrates. Pyrite production has increased by nearly 7 per cent to 848,271 tonnes. In Finmark, the Norwegian state has placed under option extensive deposits of cupreous pyrites. These deposits are to be further investigated and drilled in the current year.

One iron mine is principally an ilmenite producer with 157,833 tonnes of ilmenite concentrate as its main product. Geological and geophysical prospecting has revealed a big ilmenite ore deposit at Titania in Southern Norway.

THE NON-FERROUS MINERALS

So far as non-ferrous ore is concerned, interest is centred mostly on the experimental work for the full utilization of the constituents in pyrite ores. Sulphur, iron, copper and zinc are to be separated, reduced to their elemental form, and all the trace metals separated. The state-owned Norsk Bergverk A/S and the privately-owned Orkla Grube A/B are working on the problem in part individually, and in part in conjunction one with the other.

During 1955 production of zinc concentrates increased by 18 per cent to nearly 14,228 tonnes. Production of copper concentrates, on the other hand, diminished by 2 per cent and that of lead concentrates fell by 5 per cent.

The two zinc-lead-pyrite mines, Mofjellet and Bleikvassli in northern Norway, have been granted loans and guarantees by the state for their works. These are the principal zinc producers and the only lead producers in Norway. The developments now being undertaken will more than double their joint production.

Miscellaneous minerals are worked by five mining companies, two of which are producing 298.7 tonnes of molybdenite concentrates, an increase of 13 per cent over the previous year. One mine has yielded 306.6 tonnes of 49 per cent Nb-Ta concentrates, an increase of 70 per cent, while another has produced 5,400 tonnes of graphite and has thereby increased its output by 50 per cent.

The only silver mine in Norway, the 330-years-old Kongsberg mine, has shown a steady decline in recent years and produced only 2,000 kg. of native silver in 1955. Production will practically cease in the current year.

In the two Norwegian-owned coal fields of Spitsbergen, production was 317,319.6 tonnes, of which 303,895.3 tonnes were shipped.

Correspondence

NUCLEAR ENERGY IN MINING

THE EDITOR, *The Mining Journal,*

Sir,—I was much interested in your recent series of three informative articles on *Nuclear Energy in Mining*, which lacked only the interesting statistics now available on Canadian production. Your readers may be interested in the following published figures :

	$
Port Radium and Beaverlodge Districts, N.W.T., and Saskatchewan	
Eldorado Mining and Refining Co. ..	200,000,000 (Est.)
Gunnar Mine	76,950,000
Probable others	100,000,000 (Est.)
Bancroft District, Ontario	
Faraday	29,754,800
Bicroft	35,805,000
Probable others	60,000,000 (Est.)
Blind River, Ontario	
Algom*	206,910,000
Northspan (Lake Nordic-Spanish-Panel Merger)*	275,000,000 (Est.)
Cons. Denison	182,250,000
Milliken Lake	100,000,000 (Est.)
Stancan	100,000,000 (Est.)
Stanleigh	100,000,000 (Est.)
Can. Met.	72,000,000
Pronto*	55,000,000
Other probables	No estimate made
Total	$1,557,864,800

*Controlled by Rio Tinto of Canada.

It is to be noted that the above contracts already granted or in advanced stages of negotiation are for production periods all terminating on March 31, 1962. Applications for additional special price contracts were closed in Canada on March 31, 1956, so it is unlikely that the above figures will be changed for some time despite the recent extension to December, 1967, offered domestic producers in the United States.

Yours, etc.,
FRANC. R. JOUBIN,
Consulting Geologist.

Franc. R. Joubin & Associates,
Suite 619, 68 Yonge Street,
Toronto 1, Ontario. June 18, 1956.

[*Mr. Joubin is the geologist who directed the discovery and development of eight of the first large uranium mines in the Algom district, Ontario. The three articles referred to by Mr. Joubin appeared in our issues of May 11, May 18, and May 25.—Ed. M.J.*]

NICKEL IN CANADA—I.

Nickel Mining in Sudbury, Ontario

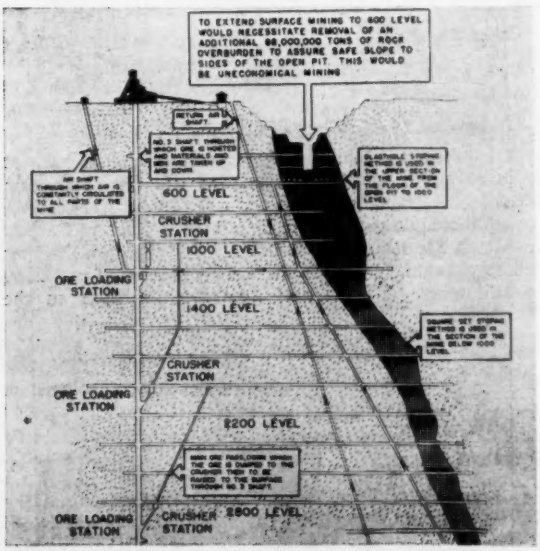
This survey of Canada's nickel production and resources is extracted from *Nickel in Canada*, a publication issued by the Canadian Department of Mines and Technical Surveys, Mines Branch. The author is W. R. McClelland, of the Mineral Resources Division. A review of world nickel resources originating from the same publication appeared in our issue of June 15, 1956. The first portion of the article, appearing herewith, describes the nickel production of the Sudbury district, Ontario, while a final instalment will discuss the nickel resources of other areas of Canada.

The first recorded production of Canadian nickel was for 1889, when an output of 415 s.tons was reported. In the 25-year period, 1926-1950 inclusive, Canada accounted for slightly over 80 per cent of the total world production of nickel. The Dominion's reserves are estimated at 5,322,000 s.tons (nickel content), of which 4,822,000 tons are being exploited or under development and 500,000 tons are undeveloped. Since the projected increase from the various developments under way throughout the Dominion more than counterbalances that from developments in other countries, it would appear that Canada will continue to maintain its present position for many years to come.

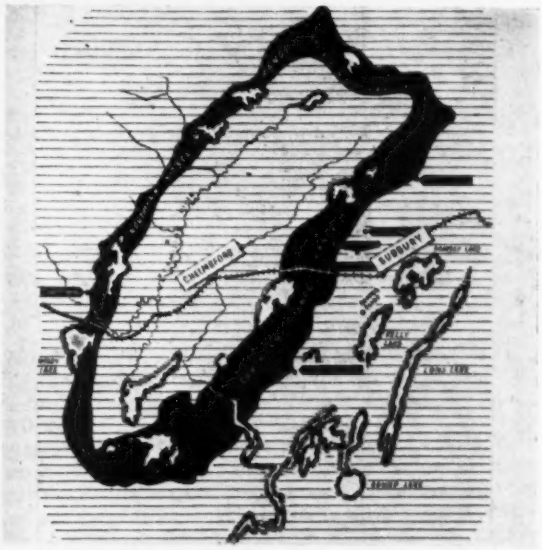
In 1955 Canada produced 175,000 s.tons of nickel, which compares with 161,000 tons in 1954 and 144,000 tons in 1953. Within the next few years a further substantial increase in production should be achieved.

THE SUDBURY DISTRICT

Except for limited development in British Columbia, the nickel industry was confined till 1953 to the relatively small area of the Sudbury basin of Ontario. Late that year Sherritt Gordon Mines Ltd. started operations at its Lynn Lake nickel-copper property in Northern Manitoba, bringing a second important nickel area under development. Exploration has since resulted in a number of significant discoveries in various parts of the Dominion and renewed interest has been taken in several of the older known occurrences. Among the more recent discoveries under active development are deposits in the Eastern Townships about 65 miles south-east of Quebec City, in North-Western Ontario, in Northern Manitoba, in the Keewatin district in Northwest Territories, and in the Kluana Lake area of South-Western Yukon.


TO EXTEND SURFACE MINING TO 600 LEVEL WOULD NECESSITATE REMOVAL OF AN ADDITIONAL 88,000,000 TONS OF ROCK OVERBURDEN TO ASSURE SAFE SLOPE TO SIDES OF THE OPEN PIT. THIS WOULD BE UNECONOMICAL MINING
600 LEVEL
CRUSHER STATION
1000 LEVEL
ORE LOADING STATION
1400 LEVEL
CRUSHER STATION
ORE LOADING STATION
2200 LEVEL
ORE LOADING STATION
CRUSHER STATION
2800 LEVEL

Cross section of a typical Sudbury nickel mine



The Sudbury Basin, showing the mines of the International Nickel Co. of Canada, Ltd.

Including the mines of the Sudbury area, Canada now has over 75 known occurrences of nickel.

The largest reserves of developed sulphide ores of nickel in the world are those of the Sudbury basin area. This basin, which is shaped like an elliptical trough, is approximately 37 miles long and 17 miles wide. The ore mineral is chiefly pyrrhotite, with which is associated pentlandite and chalcopyrite. While nickel and copper are the major metals of the Sudbury deposits, there are also minor amounts of cobalt, gold, the platinum metals, selenium, silver and tellurium. Metals of the platinum group occur in extremely small amounts, but the tonnages mined are so large, and the extraction processes so efficient, that Canada ranks as one of the largest producers of these metals.

THE INCO HOLDINGS

International Nickel's holdings in the Sudbury district cover 100,000 acres and include five producing mines: The Frood-Stobie, Creighton, Levack, Garson and Murray mines. In continuing the underground development of these mines, the company began in 1955 to prepare for mining operations at a depth far greater than ever reached before in the mining of nickel. During the year the combined underground development amounted to 396 miles.

To treat the enormous output of ore, which in 1955 exceeded 14,000,000 s.tons, the company employs two plants to provide concentrates for the smelter. The original concentrator at Copper Cliff has a capacity of 30,000 tons of ore per day. In 1951, INCO built a second concentrator

at the Creighton mine to handle increased tonnages resulting from the induced caving method of mining. This plant has a capacity of 12,000 tons of ore per day and produces a bulk sulphide flotation concentrate which is delivered via a 7½-mile pipeline to the Copper Cliff concentrator, where it enters the regular circuit for selective flotation.

The company operates two smelters, the main one being the Copper Cliff smelter, which is the largest of its kind in the world. INCO's nickel refinery at Port Colborne, Ontario, produces electrolytically refined nickel and nickel oxide. Its capacity is over 72,000 tons of electrolytic nickel a year.

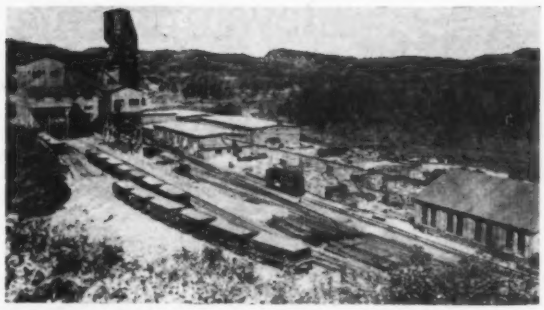
The company's ore reserves in the Sudbury area are of enormous size. At the end of 1955 measured ore reserves stood at 262,369,185 tons, the highest total on record, with a combined nickel-copper content of 7,897,830 tons.

THE FALCONBRIDGE PROPERTY

Falconbridge Nickel Mines owns a number of properties on the rim of the Sudbury Basin embracing approximately 53,000 acres. Of these the Falconbridge, McKim, Hardy, East and Mount Nickel are producing mines. Active development is being carried out on the Fecunis Lake, Boundary and Longvac deposits, all of which are expected to be in production by 1959. The most important of the new developments is that of Fecunis Lake. This deposit, which lies beneath the lake a few miles north-east of INCO's Levack mine, is estimated to contain 10,000,000 tons of ore.

The concentrator at Falconbridge has a capacity of between 2,500 and 2,600 tons of ore per day. The smelter is equipped with three blast furnaces and four convertors. Separation and refining of the metals in the nickel-copper matte is carried out at the company's refinery at Kristiansand, Norway. In order to meet the substantial increase in its output of ore arising from the new mine development under way, the company is making arrangements to expand its smelting and refining facilities.

Blasthole mining at Frood



General view of the surface plant at Inco's Levack Mine

The developed and indicated ore reserves of the Falconbridge mines and properties in the Sudbury area at the end of 1954 were 35,515,700 tons with an average grade of 1.59 per cent nickel and 0.82 per cent copper.

Among other producers currently operating in the Sudbury district are Nickel Rim Mines Ltd., whose property is in MacLennan township, on the east rim of the basin. Output is sold under contract to Falconbridge. The estimated ore reserves are 1,393,000 tons with an average grade of 1.3 per cent nickel and 0.49 per cent copper. Plans call for deepening the shaft and increasing the mill capacity.

A property in Foy and Bowell townships, about 20 miles north of Chelmsford, is owned by Nickel Offsets Ltd. The ore, which occurs in rich pockets, is in an offset extending out from the norite-micropegmatite rim of the Sudbury basin. Production from a new 300-ton daily capacity mill started in September, 1953. The company has a contract with Falconbridge for the sale of concentrates containing at least 5,000 s.tons of recoverable nickel up to September, 1957. The ore reserve is estimated to be in excess of 300,000 tons with an average grade of 1.77 per cent nickel, 1.31 per cent copper, 0.025 per cent cobalt, and $2.20 per ton in platinum metals.

OTHER NICKEL OCCURRENCES IN ONTARIO

A small amount of nickel is found in the silver-cobalt ores of the cobalt area. This is recovered and marketed as nickel sulphate.

In addition to the properties described there are a number of nickel-copper occurrences in Ontario, some of which have been partially developed. Many of them are being actively explored and in a few instances some new discoveries have been made.

The Shakespeare property in the Sudbury district, owned by Falconbridge, is estimated to contain between 3,000,000 and 4,000,000 tons of material averaging 0.34 per cent nickel and 0.40 per cent copper. Northbridge Mines Ltd., in which Falconbridge has a controlling interest, is exploring a property in Parkin township about two miles north-east of the Sudbury basin, which is of interest as the deposit occurs north of the norite micropegmatite contact.

Consideration has been given to an open-pit operation at the Trebor mine in Strathy township, Nipissing district. This deposit was developed between 1932 and 1937 as the Cuniptau mine. Exploration and development were resumed in 1948 and during 1949 over 38,000 ft. of diamond drilling was carried out. In 1949, ore reserves north-west of a diabase traversing the ore zone were estimated at 369,000 tons, averaging 1.42 per cent combined nickel and copper, while south-east of the diabase more than 2,500,000 tons of low-grade nickel-copper ore was reported.

Developments in Compressors

By C. C. DOWNIE

The importance of the compressor in various applications within the mining industry is widely recognized and, as with other items of mining equipment, these units have been improved in design and performance in recent years. The following article describes some of the developments which have taken place in compressor construction, discussing not only the larger units but the various smaller equipments with reference to the diversified design seen in some modern machines.

The compressor represents an integral unit in the layout of various mining, metallurgical, and associated chemical enterprises, and consequently has seen many changes and improvements with the passage of time. This relates not only to the latest ten-stage turbo-compressors with a maximum capacity of some 4,000,000 cu. ft. per hr., but also to various smaller units which have been developed in various ways, let alone the specialized compressors required for synthetic production of chemicals.

SOUTH AFRICAN INSTALLATIONS

Details have already appeared of former designs of large turbo-compressors of 7,000 kW., with a suction capacity of 47,000 cu. ft. of air per min., used by South African undertakings. Three stations were claimed to have a total compressor output of over 100,000 h.p. and a total supply, related to the suction state of the air, of some 8,700,000 cu. ft. of air per hr. In view of the importance attached to all features of the drive, the motors and the entire electrical parts are supplied, tested, and guaranteed prior to dispatch by an electrical concern.[1]

With the latter compressors, they had to be built for a speed of 3,060 r.p.m. in view of the direct drive by means of synchronous motors, and three-phase current frequency of 51 cycles, at the site. For the suction capacity mentioned, this number of revolutions was unduly high, and compression was effected in nine stages in spite of the high pressure ratio of 9.7 to 10.5. At an initial pressure of 14.2 lb. p.s.i. (absolute) there would thus be a delivery pressure of 138 to 149 lb p.s.i., but as the atmospheric pressure at the site was only 12.1 lb this gave a delivery pressure of 117 to 127 lb. p.s.i.

To ensure the highest efficiency, in addition to internal cooling, more extensive cooling is attained by including two external intercoolers in the middle stages. A number of refinements of this are seen in the latest ten-stage turbo-compressors, which provide the greater capacity mentioned in smaller space. Elaborate tables of output and efficiency tests have been made out, giving particulars of air, cooling-water, motor, compressor, and overall efficiency, etc.[2]

DIRECTION OF ROTOR FORCES

Smaller rotary compressors have been the subject of considerable researches, as the direction of forces acting on the rotor was found to differ from earlier conceptions. This led to the design of a specialized runner ring, which is well supported on the whole of its circumference, and can thus also take up the unbalanced forces acting on the set of blades used. The principle of pressure equalization has been further developed, and patented, while volumetric efficiency has also been raised by other new constructional features. A way has been found to remove the disadvantages of a fixed compression ratio.

Although the rigid valveless control appeared at first to be a special advantage of the rotary compressor, in the case of greatly fluctuating pressures, however, it constituted a point of inferiority to the reciprocating compressor. Accordingly, variable pressure on the compression side can be provided for by incorporating spring-actuated valves, which in no way interrupt the continuity of the inner surface of the housing, when closed. This is of special importance, since otherwise the air would flow back from a cell of higher pressure to the adjacent one of lower pressure, and which would adversely affect the compression line appearing on the diagram of the indicator.

By providing pressure equalization, the suction side of this diagram can be improved. In this instance, it would be too expensive to provide the rotor body of the rotary compressors with air or water cooling. Due to the influence of the heat of compression, the rotor expands more than the housing, which is cooled, and a corresponding amount of clearance must thus be provided between it and the housing, and the end-shields, and which must be sufficient to take care of the maximum temperature differences.

This clearance tends to become larger than desirable in the case of relatively low working pressures. To rectify this, a number of constructional changes have beeen made, and the part of the blades which remain within the rotor body is provided with a triangular slot. A spreader piece is put in the latter, being of such shape that it imparts the requisite tendency to the blades under the influence of the centrifugal force, while spring-actuated rings are also included.

Detailed measurements have been made on single-stage compressors with a suction capacity of 19,500 cu. ft. of free air per hr., and a delivery pressure of 28.4 lb. p.s.i., and the influence of pressure equalization, and of the split blades, proved their advantages at higher pressures. A standard 2¼ in. nozzle is used for measuring the suction volume, while neither nozzle nor gauge tube are changed during tests, with the power consumed measured on a calibrated direct-current motor with precision instruments. A torsion balance inserted between motor and compressor is used to check the results.[3]

ADAPTATIONS AND IMPROVEMENTS IN RECIPROCATING COMPRESSORS

While the installation of rotary compressors underground has seen many developments, most of these are driven by electric means, and sets of units compressing in two stages frequently suffice.

To a lesser extent, single-stage rotary compressors engaged on wet extraction and associated chemical work are driven by back-pressure steam turbines, or back-pressure steam engines. One of these had a suction performance of 58,000 cu. ft. per hr., with a final pressure of from 7 to 14 lb. p.s.i., while another provided 12,400 cu. ft. per hr., at 28 lb. p.s.i. A small advantage is that the speed of the turbine may be altered to any desired suction output.

Other models of compressors have been adapted so that they may be mounted on sludge removal trucks, for travelling on rails, or for mounting on pontoons, apart from the smaller two-stage portable rotary compressors. (One of the latter has provision for operating as a petrol motor during freezing conditions at the commencement, and later changing over to Diesel drive.[4])

It is claimed that air-cooled reciprocating compressors of the two-stage order suffice for small outputs. In recent models, cooling fins are added to the cylinders and cylinder heads, and the cooler is formed by a number of ribbed tubes lying in the cooling-air stream produced by the flywheel. The latter is equipped with vanes for the purpose, the largest model of which has a capacity of 3,000 cu. ft. of air per hr. at a pressure of 110 lb. p.s.i. Use is made of oil wiper rings as a means of keeping oil off the cylinder walls in the plunger-type of compressor.

In view of the increased rates of revolution in modern units, the amounts of heat to be dissipated per unit of time have likewise been increased, and require to be carefully guarded against with continuous operation. In order to maintain the lubricant film intact on the cylinder surfaces, effective cooling is essential.

DESIGN OF RING VALVES

The conventional design of ring valve with one or more rings has progressed to where valves of this kind, complete, and ready for incorporation in the compressors, are supplied. Multiple-ring valves are preferred, as they are better suited to operation at high speed, because of their shorter stroke, and smaller overall diameter.[5]

The earlier method of producing valve plates by stamping has been abandoned, as defects arose, and likewise holes and slots have been superseded by use of annular valve plates for every seat, for multiple ring valves. Regarding operating data, the effect of intake temperature on capacity and other features have been supplied in tables.[6] An elaborate account of compressed air used during the late war period, describing equipment and accessories, etc., appeared in *Power*, Vol. 87, pages 83-98, by Allis Chalmers, and others.[7]

Apparently, the mass of air and gases set in motion by compressors and blowers in the ferrous industries in 1942 amounted to 240,000,000 tons, one natural gas company had 100,000 h.p. in compressors, while with explosives, the daily production of 30 tons of synthetic ammonia involved some 22,000 h.p. of high-pressure compressors and circulators. While some gases are handled at 2,000 lb. p.s.i., ammonia and hydrogen are dealt with at 5,200 lb. p.s.i. Cost data is available in a series of tables.[8] The importance of ensuring compressed air free from oil has caused a number of earlier models of reciprocating compressors to be converted to "oil-less" operation.[9]

SOME MODERN DESIGNS

One modern five-stage single-shaft compressor, has an intake capacity of 450,000 cu. ft. per hr., working against a back-pressure of 3,900 lb. p.s.i., requiring 4,000 h.p. to drive it. Double this capacity is obtained by a twin set of the same design, as used for chemical activities. A further model by the same concern, has the compressor driven by a gas engine, although the twin set uses an electric motor. At a stroke of 49 in., and speed of 94 r.p.m. the mean piston speed is some 13 ft. per sec., and the overall length of the machine is some 66 ft.[10]

It should be added here that while compressors of this kind are mainly for the chemical industry, a variety of smaller compressors are required for supplying chlorine, oxygen, and other gases, even including acetylene, for metallurgical operations.

A brief review of other forms of air and also gas compressors will reveal that developments have been made in a somewhat diversified manner. For example, for the heaviest duty a special type of air-cooled two-stage high-speed compressor has been evolved.

While the capacities of this line range from 150 to 4,800 cu. ft. per hr., the pressures are claimed to be up to some 430 lb. p.s.i.[11] An alternative model of water-cooled, two-stage twin compressor, which is motor driven, is designed with either one or two cylinders, for capacities ranging from 530 to 10,000 cu. ft. per hr., and for pressures up to 430 lb. p.s.i.[12] Where long-distance gas supplies are required, gas compressors of the twin-cylinder compound type have been developed with a capacity of 205,000 cu. ft. per hr., at 200 lb. p.s.i. pressure.[13]

Different models of water-cooled two-stage rotary compressors, which are motor-driven, and have the intercooler mounted on the top have been devised. In one of these, the capacities range from 7,000 to 140,000 cu. ft. per hr. at pressures of from 11½ to 115 lb. p.s.i. The other, of the same general construction, has a capacity of from 640 to 80,000 cu. ft. per hr., at 114 lb. p.s.i., while pressures can range from 57 to 142 lb. p.s.i.[14]

A vertical type of two-stage compressor has a capacity of 16,000 cu. ft. per hr. at a pressure of 142 lb. p.s.i.[15] Compressors for nitrogen, helium, ethylene, and gas mixtures for synthesis in up to five stages, have also been developed.[16]

In addition, compressed air is sometimes required which is literally entirely free from oil. To meet this requirement, a specialized form of air-cooled, single-stage reciprocating compressor has been evolved. This range of units is constructed for belt drive, or as self-contained machines with built-in electric motors, while the capacities range from 150 to 660 cu. ft. per hr., where the end-pressure is 85 lb. p.s.i.[17]

USE OF OXYGEN

The use of oxygen in metallurgical plants of different varieties has developed very considerably since the late war period, and has resulted in the price being materially reduced. In its train, this has aroused greater interest in the compression of oxygen, and one of the large types of machines for this purpose is a three-stage compressor. This is of 185 h.p. with an 18 in. stroke, while its capacity is 27,000 cu. ft. per hr. at 700 lb. p.s.i., while it operates at 125 r.p.m.[18] A smaller type of machine has also been developed in the form of a vertical three-stage compressor, which likewise operates at 125 r.p.m. to provide 180 cu. ft. per hr. at an end-pressure of 2,100 lb. p.s.i. The same firm has developed another design of vertical three-stage compressor for acetylene, which operates at 90 r.p.m. and has a capacity of 1,050 cu. ft. per hr., at an end-pressure of 430 lb. p.s.i.[19] Lastly, regarding block compressors, a two-stage model with intercooler has a capacity of 3,600 to 16,200 cu. ft. per hr., at a pressure of 115 lb. p.s.i.[20]

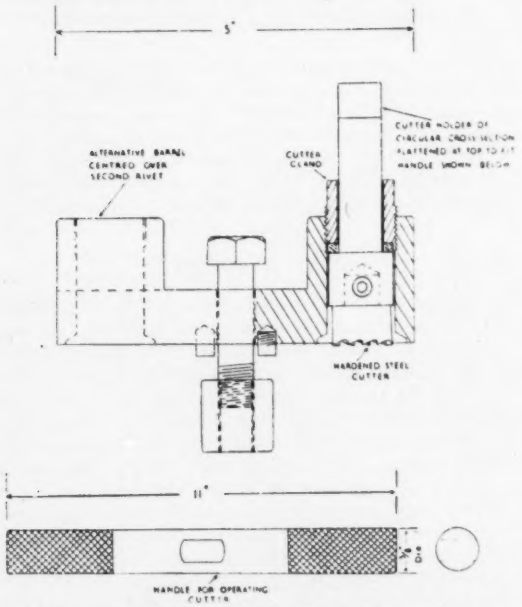
REFERENCES

(1) Siemens-Schuckertwerke, Mulheim.
(2) Demag, A.G., Duisburg.
(3) Klein, Schanzlin & Becker, A.G., Frankenthal.
(4) Same as No. 2.
(5) K. R. Dienes, Vilkerath, Cologne.
(6) Ingersoll Rand, Co., New York, N.Y., U.S.A.
(7) Allis Chalmers, Mfg. Co., Milwaukee, Wis., U.S.A.
(8) The Compressed Air Institute, Washington, U.S.A.
(9) American Air Compressor Corporation, North Bergen, N.J., U.S.A.
(10) L. Schwartzkopff, Berlin (for Farbenindustrie).
(11) Knorr-Bermse, A.G., Berlin.
(12) Klienschanzlin, A.G., Homborg, Sarr.
(13) Dinglerwerke Pumpen, A.G., Zweibrucken.
(14) K. Wittig G.m.b.H., Schopfheim/Baden.
(15) Ehrhardt & Schmer, Saarbrucken.
(16) Norwalk Company Inc., Norwalk, Conn., U.S.A.
(17) Same as No. 11.
(18) Zwickauer Maschinenfabrik, Zwickau.
(19) G. A. Schutz, Wurzen i. Sa.
(20) Flottmann A.G., Herne.

Recent Developments in the U.K. Coal Mining Industry

A device that simplifies the extraction of rivets from A.B. Dreadnought Coal Cutter chains has been produced at Mapperley Colliery in the East Midlands Division. The device consists of a block of mild steel which is fastened rigidly to the chain and in such a position that the cutter is placed centrally over the rivet to be extracted. The cutter is of hardened steel with eight teeth. Pressure is put on the cutter by means of the gland shown, and a recess is cut in the rivet head by turning the cutter with the handle provided.

After this recess has been cut the countersunk head of the rivet is sheared off with a sharp blow, and the rivet is easily extracted. The block is so made that it is possible to cut both rivets in one link without removing or resetting


5"
CUTTER HOLDER OF CIRCULAR CROSS SECTION FLATTENED AT TOP TO FIT HANDLE SHOWN BELOW
ALTERNATIVE BARREL CENTRED OVER SECOND RIVET
CUTTER GLAND
HARDENED STEEL CUTTER
11"
HANDLE FOR OPERATING CUTTER

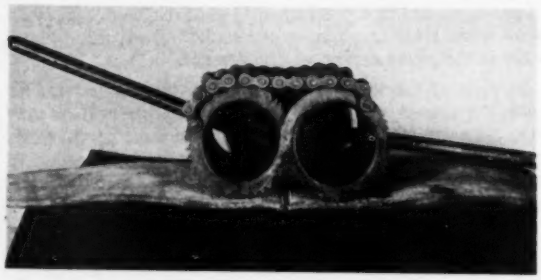
it. It is made with two identical barrels at dreadnought chain rivet centres, and the cutter is moved into position over the second rivet simply by unscrewing the gland nut, withdrawing the cutter adapter and cutter from the first barrel and placing it in the second barrel, then screwing the gland into position again.

A TOOL FOR HUGH WOOD PILOT BELTS

A tool, designed at Hazlerigg Colliery, Northumberland, is intended primarily for fixing the pilot belts on Hugh Wood Face Gear Heads. It can also be used for joining conveyor and driving belts.

These pilot belts transmit the drive from the driving rollers to the conveyor belt, being tensioned by a spring loaded idler. Considerable difficulty has always been experienced in bringing together the ends of a pilot belt when they have to be joined; under wet and slimy conditions these difficulties are increased.

The new grips are made of two light steel tubes with sides flanged and serrated to provide the grip on the belt. The tubes are coupled by chain. When placed in position on the pilot belt, the serrated edges of the rollers grip the belt, and



the partial rotation of these rollers by the exertion of pressure on the toggle bars draw together the ends of the belt to enable the hinge pin of the belt fastener to be inserted.

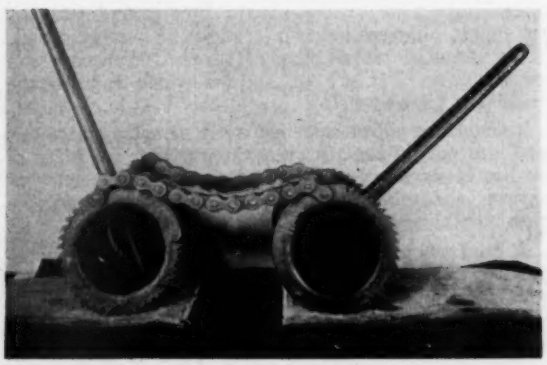
THE FERODO FEROBOND SYSTEM

An entirely new method of attaching linings to brakes on colliery winders, winches and other heavy engineering plant has been devised by Ferodo Ltd. Known as the Ferodo Ferobond System, it involves insetting and bonding metal strips into the back of the lining. Countersunk holes or slots located at the ends of the strips are used

Above: The tool for fixing the pilot belts on Hugh Wood Face Gear Heads with the belt ends forced together
Below: The tool in position with the ends of the belts separated
Opposite: A device for simplifying the extraction of rivets from A.B. Dreadnought Coal Cutter chains

for securing the lining to the shoe or band. The linings can thus be quickly removed without the brake mechanism being dismantled.

There are four important advantages in the Ferodo Ferobond System of attachment. First, quick replacement can be made with minimum disturbance to plant. Secondly, the wear value obtained far exceeds that achieved by any method of securing linings at present in common use. Thirdly, the amount of wear taking place is at all times visible and risk of brake path damage can thus be avoided. Finally the bolt recess allows the products of wear to escape freely, thus eliminating one source of potential brake path scoring.



MINING MISCELLANY

The Southern Cameroons Government is negotiating for a survey of tin deposits believed to exist in Wum Division.

* * *

The French gold mining company, Société Anonyme des Mines et Usines de Salsigne, has asked the local authorities for an exclusive prospecting permit for gold, copper and other metals in the Aude Department of southern France. If granted, the permit would cover an area of 9,300 hectares.

* * *

A report from New York states that Minerals, Inc., a recently organised company, has entered into an agreement to purchase from the Chavin Mines Corporation of Peru a lead-zinc-copper-silver mine in south central Peru for $2,400,000. Exploration and development of the mine were started in 1952.

* * *

The Hudson Bay Mining and Smelting Company Ltd. announce that exploration reports from the Snow Lake area, 25 miles east of its main properties at Flin Flon, Manitoba, continue to be encouraging. The directors have authorised construction of an eight-mile road from the existing Snow Lake highway to the Chisel Lake properties, a 4½-mile power line to the property, and the sinking of a shaft.

* * *

One of the most ambitious prospecting ventures ever launched in Canada is that of Mining Geophysics Co., a new incorporation, which has been firmly underwritten to place $5,200,000 in its treasury. The company will use the latest geological and geophysical methods to prospect for new mines. Its searches will be conducted on a large scale, the first approach in most cases being by aerial surveys. It is the intention of Mining Geophysics to operate as a prospecting and operating company in its own right and for outside parties. It already owns 198 claims outright and has 15 claims under option in ten areas. It also has a stake in three active companies by virtue of large holdings in Temagami Mining Co. Geo-Scientific Prospectors and Mogul Mining Corporation.

* * *

Sierra Leone Development Co. Ltd. proposes to extend its present operations in the Northern Province of the Protectorate by the development of a new mining area at Tonkolili, by which production will be raised to a maximum of 3,600,000 tons per annum. The development will involve capital expenditure on fixed assets estimated at approximately £15,000,000, and spending is contemplated at some £3,500,000 on 73 miles of 3 ft. 6in. gauge railway, as well as the necessary mining and power plants, extensions to the company's port at Pepel, housing, a hospital and other welfare buildings, together with roads and other ancillary services. Discussions are proceeding with Robert Benson, Lonsdale and Co. Ltd. and N. M. Rothschild and Sons regarding the raising of the additional capital over the approximate £6,000,000 at present available. Application has been made to the C.I.C. for the necessary permission.

* * *

Fifty-one units, comprising one of the largest Euclid fleets ever to be assembled on one job in the United Kingdom, are working night and day for Costain Mining Ltd. at the Acorn Bank opencast coal site in Northumberland. This site was officially opened on July 20, 1955, when it represented the largest single contract for opencast coal operations ever placed in Britain. It is hoped that about 5,000,000 tons of coal will be won from Acorn Bank during the next six or seven years. Photographs of the Euclid fleet at work are reproduced by the Blackwood Hodge Organisation with the Director's Report and Accounts for the year ended October 31, 1955, which are presented in a splendidly illustrated publication of the highest standard. The Group's works at Northampton is one of the largest of its kind in the world devoted to the servicing and rebuilding of earth-moving equipment. In addition, special regional depots now being erected in Durham and South Wales will provide on-the-spot servicing for Blackwood Hodge equipment operating in these important mining areas.

* * *

Up to the end of March, 330 applications were received by the Central Land Board for Part I payments in respect of land comprising some element of mineral value. About two-thirds of the applications were found to require no special treatment under the Town and Country Planning (Minerals) Regulations, 1954, or the corresponding regulations for Scotland. They were then dealt with under the general procedure for Part I payments. Thirty applications were determined in which the calculation of the payment was affected by the special mineral provisions and adapted forms of determination were issued. The remainder were still being examined or were in course of negotiation. As the board explained in its report for 1954-55, persons who paid a development charge for the winning and working of minerals for a period after December 31, 1954, were invited to apply for a variation of the determination in accordance with the provisions of Section 54 (56). As a result, 68 applications for variation were received during the year and 54 refunds amounting to £16,329 were made.

PERSONAL

Mr. C. B. Anderson has been elected president of the Transvaal and O.F.S. Chamber of Mines. Messrs. H. C. Koch and P. H. Anderson are vice-presidents.

* * *

Sr. Jorge Zarco Krammer, president of the Bolivian Mining Corporation will represent Bolivia at the forthcoming International Tin Agreement talks in London. He was expected to leave La Paz on Monday, June 25.

* * *

Sir Richard Yeabsley, C.B.E., has been appointed deputy chairman of F. Perkins Ltd. He succeeds Captain A. J. M. Richardson, who has resigned owing to pressure of other business. Mr. M. I. Prichard has been appointed deputy managing director.

* * *

In our issue of June 15 it was stated that the Rt. Hon. Earl of Swinton performed the opening ceremony at the plant of Hess Products Ltd., in Littleborough, Lancs. We are advised that this statement was incorrect, as Lord Swinton was unable to attend the function owing to a family bereavement.

* * *

Mr. W. E. Groves will retire from the post of London Manager and Secretary of Anglo American Corporation of South Africa Limited on June 30th, but will remain with the Corporation in a consultative capacity. Mr. W. C. Squire, Mr. R. V. Pritchard and Mr. G. E. Simmonds, now Assistant London Secretaries of the Corporation, have been appointed Joint London Secretaries, and Mr. J. R. Byles, Assistant London Secretary, from July 1st.

* * *

Mr. P. H. A. Brownrigg has been appointed a London Agent of Anglo American Corporation of South Africa Limited from July 1.

* * *

Safety Products Ltd. have removed to larger offices and factory premises acquired at Holmethorpe Avenue, Redhill, Surrey, to which all communications should be addressed. The telephone number is Redhill 4304/5. A small London Office is being retained at St. George's House, 44 Hatton Garden, E.C.1, but administration will be carried on at Redhill.

* * *

With effect from July 9, the address of the offices and works of International Refining Co., Ltd., will be Stratford Copper Works, Sugar House Lane, Stratford. Telephone: Maryland 7771 (five lines). The company's telegraphic address is Metoxyde London Telex.

* * *

Charles Barker and Sons Ltd. have moved to new offices at Gateway House, 1 Watling Street, London, E.C.4. The telephone number remains City 1133.

CONTRACTS AND TENDERS

The International Co-operation Administration (I.C.A.) has announced the following future procurement:

Turkey

Equipment for Murgul Copper Mine expansion (PIO/C No. 77-21-269-9-60096), comprising mine cars ($31,000) and 210-ton/hr. capacity aerial ropeway complete with buckets, including erection services ($370,000). Terminal delivery date, 30/6/58. B.O.T. Ref: ESB 15986/56/ICA. Telephone inquiries to Chancery 4411, extension 360.

* * *

K. G. Khosla and Co. Private Ltd., 1 Deshbandhu Gupta Road, New Delhi, 1, India, invite quotations from U.K. manufacturers for a steel lined ball mill capable of grinding about 1 ton per 24 hours of hard materials such as quartz, magnetite, etc., to a fineness of minus 200 mesh. The electricity supply with be 200 volts, single phase, 50 cycles, and 440 volts, 3 phase, 50 cycles. Manufacturers interested should write direct to the Indian company, at the same time notifying the U.K. Trade Commissioner, Eastern House, Man Singh Road, New Delhi, that they have done so. B.O.T. Ref., ESB/16053/56. Telephone inquiries to Chancery 4411, extension 776.

MACHINERY AND EQUIPMENT

A New Snorer Pump for Modern Machine Mining

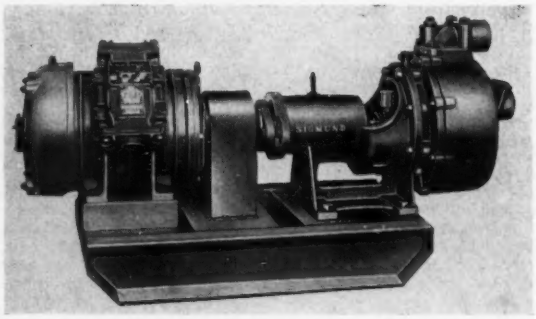
To carry out its duties efficiently, a mine pump destined for work near the machine face must be light and portable, easily serviced, and possessed of considerable pumping capacity. These factors have been main considerations in the design and construction of the new range of self-priming centrifugal mine drainage pumps manufactured by Sigmund Pumps Ltd. Designated the type M-G, the range is intended for snorer duties, and is presented by the manufacturers as suitable for pumping duties during face advance, dip heading development and other mining operations that take place under wet conditions in areas removed from the shaft.

The pumps are not merely intended for service within the coal mining industry, but are designed to meet pumping requirements in metalliferous as well as carboniferous mines in the United Kingdom and overseas.

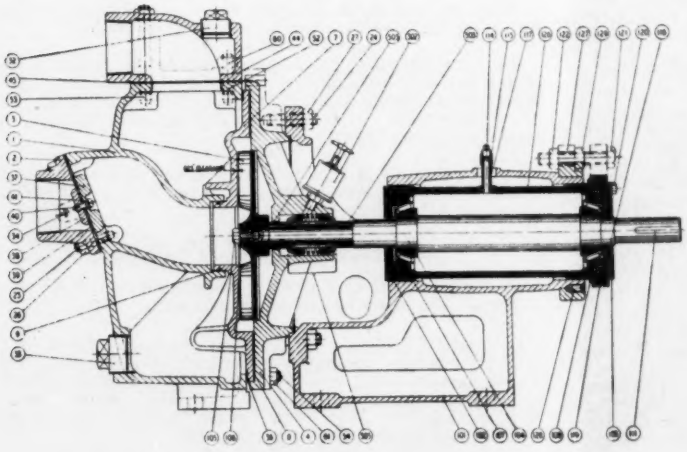
The new Sigmund range of pumps are automatically self-priming and are suitable for remote location and control. No valves or by-passes are included to lower pumping reliability. Branch sizes are 2 in. by 2 in., outputs are up to 5,300 g.p.h. and the pumps are suitable for heads up to 110 ft. The units can be installed in thin seams with the minimum headroom of approximately 2 ft. Overall dimensions of the pump only are length 28½ in., width 11¼ in. and height 17 in. Complete with motor and mounted on a baseplate these dimensions are respectively 46 in., 21 in. and 21 in. No foundations are required and the pumps will work on any incline.

The open-pit impeller is the only moving part of these units and the complete bearing support can be moved without dismantling. Impeller adjustment can be made underground. The pumps are self-priming in the fullest sense and will operate for long periods under snore conditions without the application of any external snoring device. Because of the fitment of open-type impellers solid matter is discharged without clogging or is accumulated within the pump chamber. The discharge branch can be fixed in four 90 deg. positions in the horizontal plane thus obviating the use of bends.

These pumps are manufactured in three sizes, namely M-GL 3, M-GL 4a and M-GL 5a. Total heads range from 40 ft. to 109 ft.



The MG-L 4a mine drainage pump with flameproof motor



Sectional arrangement self-priming centrifugal mine drainage pumps, Sigmund type M-G

1 Pump casing, 2 Suction flange, 3 Impeller, 4 Stuffing box, 7 Volute (wear plate), 8 Joint, 9 Seal ring, 23 Stud, 24 Stud, 26 Nut, 27 Nut, 32 Priming plug, 33 Casing plug, 34 Gauge plug, 37 Check valve body, 38 Check valve plate, 39 Check valve joint, 40 Screw, 41 Lock washer, 44 Discharge flange, 45 Joint, 52 Stud, 53 Stud, 54 Stud, 60 Nut, 61 Nut, 101 Support frame, 102 Front bearing cover, 103 Rear bearing cover, 104 Shaft, 105 Impeller bolt, 106 Impeller washer, 107 Bearing (front), 108 Bearing (rear), 111 Key for coupling, 114 Lubricating plug, 115 Female nipple, 116 Felt ring, 117 Lubricating tube, 119 Shims, 120 Bolt, 121 Adjusting bolt, 122 Hexagon nut, 126 Bearing housing, 127 Adjusting flange, 128 Grub screw, 129 Hexagon nut, 302 Grease lubricator, 503 End sleeves, 505 Mechanical seal, 36 Sealing washer

Machine Tool Exhibition

The International Machine Tool Exhibition is being held at Olympia, London, from June 22 to July 6. Among the exhibitors are the following well-known manufacturers of mining equipment: Birlec Ltd., The British Thomson-Houston Co. Ltd., Metropolitan-Vickers Electric Co. Ltd., L. M. Van Moppes and Sons (Diamond Tools) Ltd., and T. W. Ward Ltd.

Underground Hydraulicing in the U.S.S.R.

Underground hydraulicing is finding increasing application in coal mines of the U.S.S.R., and it is said that this method of coal winning is to find widespread use in the overall plan for coal that is part of the sixth Five-Year Plan.

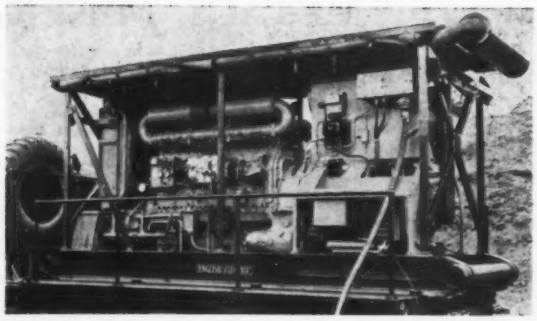
The Soviet method is eventually to supplement mechanical breaking and cutting machines by water jets. In operation, a hydraulic monitor is set in front of the coal face. A jet of water at 30 atmospheres of pressure strikes the coal layer, washing it out from the natural bed and producing some fragmentation. The force of water causes a disintegration of the coal to great depth until finally the coal crumbles and is washed away.

Subsequently, the coal-bearing water flows along the roadway in specially constructed iron gutters. At the bottom of the pithead shaft all the streams converge into a small reservoir. The conveyed coal is subjected to crushing in powerful mills before being deposited in the reservoir. The mined coal pulp is then pumped to surface for drying and cleaning.

It is of interest to note that the Russians claim to have utilized this method as long ago as 1940. Several years ago the hydraulic method was employed in one of the sections of the Tyrganskiye Uklony mine in the Kuzbas.

In 1953, again in the Kuzbas, the Polyvayevskaya Severnaya mine commenced operations as what was claimed as the first fully hydro-mechanized mine in the world. The working of this property is stated to have shown that hydraulic monitors increase the productivity of miners by 2 to 2½ times and that coal output is increased while its cost is decreased.

It is of interest that this method of coal winning was reportedly proposed by Professor V. E. Muchnik, a Soviet scientist. Owing to the



The towing vehicle of the Mobile Winder carries the diesel generator

introduction of cutting machines and coal combines as a replacement for pick axe labour as the coal breaking medium at the face, Muchnik proposed the additional refinement of replacing these mechanized units by powerful water jets.

A Mobile Emergency Winding Equipment

A mobile winding equipment unit, the idea of which originally was conceived during the war as a stand-by plant for collieries possibly rendered inoperative through enemy action, has now been produced by the joint efforts of Robey and Co., Lincoln, and The English Electric Company.

The unit, which was inspected by representatives of the technical press on June 15 at Newburgh Colliery in the Northumberland and Cumberland Division of the N.C.B., is presented as a mobile unit specifically designed as a safety measure to extricate miners from pits in the event of shaft gear becoming immobilized through power failure, fire, fouling of cages, or the breakage of shaft timber or ground. Nevertheless, the value of the unit in mine development or for shaft repair cannot be overlooked. Nor should it be forgotten that the N.C.B. is entirely dependent up mains power supplies.

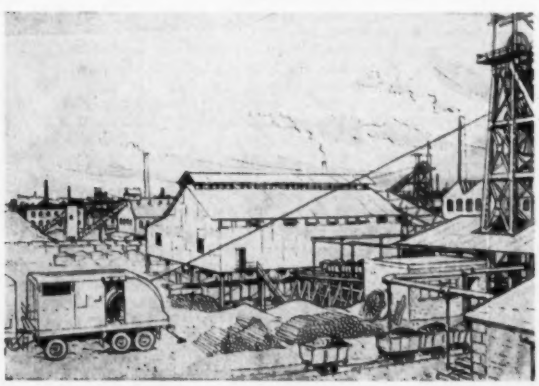
Despite this initial emphasis upon U.K. coal mining, the mobile winder obviously has wide applications in metalliferous mining both in this country and overseas.

The prime mover of the winder is an English Electric 6-cylinder naturally aspirated diesel engine of the H series, the engine having a bore and stroke of 6 in. and 8 in. respectively with a rated output of 195 b.h.p. at 1,250 r.p.m.

The winder is coupled to a large towing vehicle. This towing vehicle carries the diesel generating set, whilst the trailer carries the mobile winder equipment. The winder is equipped with the Robey-Crompton positive power brake. The towing chassis was supplied by A.C.V. Sales Ltd.

The towing vehicle and trailer are electrically connected by means of trailing cables to which are fitted special type mining flit plugs which accelerate and facilitate connection of the cables to the various items of apparatus.

The winder motor is rated at 95 h.p. ± 0/1,000 r.p.m., ± 0/320 v. D.C., and drives the 4 ft. dia. by 3 ft. drum through double reduction gearing. The winder is controlled on the Ward Leonard system and is designed to sustain a rope end load of 2 tons at a maximum speed of 8 ft. per sec. for winding depths up to 3,000 ft. In addition to tyred road wheels, the equipment can be fitted with steel wheels for travel on standard gauge rails.



Above: Sketch of the Mobile Winder in hoisting operation

Further Expansion of Alumina Production in Jamaica

Plans for the construction of a second alumina manufacturing plant in the island of Jamaica to utilize local bauxite ores and keep pace with expanding primary aluminium capacity in Canada were announced recently by Aluminium Ltd. The company's subsidiary, Alumina Jamaica Ltd., will start construction immediately on a new plant to produce 245,000 tons of alumina per year. First production is expected by mid-1958 at an estimated capital cost of approximately $35,000,000. The company's initial plant is now being extended to 550,000 tons of alumina per annum and with the new plant is designed principally to support the 330,000 tons of primary aluminium capacity planned for the company's Kitimat smelter.

This expansion of production is in keeping with the general trend of the Jamaican bauxite mining industry. In February it was announced that Reynolds Jamaica Mines Ltd. were to start construction work on expanding their bauxite plant at Lydfort, Saint Ann.

Opposite: Open pit bauxite mining at Mandville by Alumina Jamaica Ltd. The new expansion is designed to provide the alumina for the Kitimat smelter

METALS, MINERALS AND ALLOYS

COPPER.—Now that the fears of strikes this summer in the American domestic copper industry are largely dissipated as a result of the agreements already reached by Phelps Dodge, Anaconda and the A.S. and R., the feeling seems to be growing in New York that early next month we may see a cut in the domestic producer's price to perhaps 40 c. Having regard to the relatively painless progress of this year's wage negotiations it is possible in retrospect to see the producer's wisdom in keeping prices steady while negotiations were pending. At the same time the discrepancy between the U.S. producers' price and the free market price is obviously one which cannot be maintained indefinitely.

Last week's Nkana stoppage duly developed into a three day protest stoppage called by the African Mineworkers' Union throughout the Copperbelt. There was a full resumption of work last Monday and then again on Tuesday there was a virtually complete stoppage at Nchanga, instigated apparently by the African National Congress on the grounds that the compulsory wearing of leg-guards as a safety precaution was in fact a badge of racial discrimination in that the regulations were not enforced in the case of Europeans. Having regard to the close affinity between the African National Congress and the leadership of the African mineworkers, it is difficult to view last Tuesday's unauthorized stoppage (the men were ordered by their union to return to work on Thursday morning) as other than a further reflection of the resentment felt by the African mineworkers over the compulsory transfer to the African Staff Association of their members up-graded under the African advancement scheme.

It is, of course, perfectly true that the union has no legitimate grounds for complaint in that these transfers are taking place in accordance with demarcation agreements already reached between the companies and the two African unions. It is equally understandable that the companies should be anxious to insulate the more responsible African workers from the less desirable influences in the present leadership of the African Mineworkers' Union. Nevertheless, aside from the obvious irritation which this is causing the union, this policy is not without its inherent weakness. It has long been a source of complaint by the companies that the officials of the union have been recruited largely from outside the ranks of the miners, yet if most of the better human material in the union is progressively going to be siphoned off into the Staff Association as advancement proceeds, it is difficult to see how the union is ever going to have the opportunity of building up a more stable and responsible body of opinion in its own ranks.

In the last analysis this whole question is one of degree and it may well be that the interests of all would best be served if compulsory transfer to the Staff Association were limited to those Africans whose new jobs were of a predominantly supervisory nature. Quite aside from the objections to divesting the African union of its more responsible members, it would be a tragedy if African advancement became synonymous with membership of the African Staff Association.

LEAD AND ZINC.—Both metals have been quiet on the New York market during the past week. The principal uncertainty has been centred on the outcome of the wage negotiations in the steel industry which could have a direct effect on the demand for g.o.b. zinc. Meanwhile, high grade zinc remains under the shadow of the reduced activity in the car industry while in the case of lead, battery manufacturers have yet to re-enter the market. It is, perhaps, significant that the G.S.A. is understood to have taken less lead this month than was on offer by domestic producers. This is the first sign there has been of Washington not being necessarily prepared to support the market to the full at present prices.

Refined lead to U.S. domestic consumers in May totalled 40,703 tons against 46,130 tons in the corresponding month last year. The two months' old strike at the New Jersey Zinc Company's two plants in Pennsylvania and Illinois was expected to end this week. The stoppage has resulted in a loss of slab zinc production of around 20,000 tons.

First ore shipments from the lead and zinc mines at Mastervig in Greenland are expected to occur next August. About 8,000 tons are reported to be available and it is thought that next year's rate of output would be in the neighbourhood of 18,000 tons of ore.

TIN.—With the International Tin Council due to meet in London next Monday, the I.T.A. is at last becoming a practical issue. With the prospect of quota control not more than six or nine months away, it is not surprising to find the producing countries anxious to round up stragglers who have not yet committed themselves to the Agreement. Chief of these is, of course, Thailand, which at present has an annual output of around 15,000 tons. Not only would this output not be subject to quota restrictions unless Thailand endorses the Agreement, but in addition Thailand has still a considerable potential for stepping up her rate of production. In these circumstances it is not surprising that Tengku Abdul Rahman is reported to have intervened personally with the Thai government on this issue. Indications at present are that Thailand though by no means enthusiastic might be prepared to support the Agreement provided that some means could be worked out of helping her to finance the commitments she would assume under the Agreement in helping to build up the buffer stock.

The U.S. Federal Facilities Corporation has been arranging for the delivery of further concentrates to the Texas Smelter. The Bolivians are to supply 3,500 tons in the third quarter and the Congo 500 tons. It is expected that tonnages will also be taken from Indonesia and Thailand although no agreement has apparently yet been concluded. *The American Metal Market* estimates that in any event not more than a maximum of 2,500 tons is likely to be supplied from these two countries in the third quarter.

ALUMINIUM.—Despite the slightly easier market position, the aluminium industry in the U.S. remains firmly convinced that no limitation can be placed on the use of this metal in the industrial and economic future of its country. This confidence is based on the current strength of proved markets, together with the existence of numerous fields that have not yet been acquired and a rapidly growing population. Mr. E. B. Wilber, vice-president and treasurer of Alcoa, considers that by 1960 the U.S. aluminium industry may be producing 2,300,000 s.tons of primary aluminium against the record output of 1,565,000 tons in 1955. He estimates that, including scrap recovery and imports, a total supply of 3,000,000 tons would then be available to meet domestic demands. This would be about 50 per cent above 1955 consumption. Alcoa itself plans to spend around $600,000,000 in the 1956-60 period for expansion, including a 150,000 ton reduction plant which would increase primary production to more than 942,000 tons by 1960, a new alumina plant, another bauxite carrier, and various extensions to fabricating facilities.

NICKEL.—Both in the U.S. and the U.K. there is a divergence of opinion regarding the nickel situation. According to the National Association of Purchasing Agents, the majority forecast in the U.S. is that, if nickel users can exist through the next two years, there will then be nickel for them in relative abundance. The minority point of view is that, due to expanded industrial activity, higher standard of living, new products, and the requirements of the jet-atomic age, nickel will continue indefinitely in short supply. There is much agitation among lesser producers to increase the price. The so-called "black market" nickel sells for up to four times the published price. Much of the nickel purchased for the U.S. stockpile is produced at premium costs. Nevertheless, INCO is determined to maintain the present price, in line with its policy of charging stable and reasonable prices in order to enable nickel to remain highly competitive with other metals and so stimulate the sound growth of the industry. It is considered reasonably certain that more nickel will be progressively liberated by the government, and that some day marginal producers will have to bring down their costs and start selling competitively. Meanwhile the Bureau of Foreign Commerce has announced that, owing to the acute shortage of nickel for domestic civilian use, exports of all nickel-bearing scrap metals generally will not be approved in the third quarter.

In London a softening tendency has been noted in some quarters. Increasing difficulty has been reported in securing more than £1,500 per ton from British buyers for marginal needs. The official quotation for 99.5 per cent nickel is £519 per ton (home trade). On the other hand, opinion is fairly unanimous that up to £2,000 or possibly even more can be realised on the Continent. There are also reports of an easing in the U.K. domestic price for pure nickel scrap, which now seems to range up to £1,200 per ton down to £1,000 for anodes and sheet cuttings. This downward trend has been ascribed in part to the arrival of increased quantities of Japanese virgin nickel purchased some time ago and partly to reduced demand from the motor industry. The second of these factors is, of course, of an essentially temporary nature.

QUICKSILVER.—A few weeks ago the supply position of quicksilver tightened considerably. Having opened the year at

around £88 10s.-£89 per flask, ex-warehouse, prices drifted downwards to £85, at which they remained for several weeks. About the middle of May the price for immediate delivery was raised to £86 10s.-£87 for limited lots, and early in June quicksilver was quoted at £87 10s. This reversal in the market trend was attributed largely to a mild squeeze in on-the-spot supplies which now seems to be on the way out, a price of £86-£86 10s. per flask being at present indicated. Current supplies are reported to include consignments from Mexico and Turkey and some Spanish metal has also arrived.

It is noteworthy that in the first quarter of 1956 the U.S. imported 14,296 flasks, this total being the largest since the third quarter of 1954. In the whole of 1955 imports totalled only 20,647 flasks compared with 65,316 flasks in 1954. Of the receipts in the first quarter of 1956, Spain supplied 36 per cent, Italy 29 per cent, Mexico 27 per cent, and Yugoslavia 8 per cent. Supplies from Spain during this quarter were only 6 per cent less than receipts of Spanish metal in all 1955.

Demand for quicksilver in the U.S. has been quiet. Quotations for bulk amounts declined from $280 a flask at the beginning of the year to $258 a flask currently. Italian quicksilver producers are reported to have sold about 10,000 flasks to the U.S. Government at a price equivalent to about $255 a flask delivered New York. Industry sources believe that removal of the Italian metal from the market may bolster prices.

URANIUM.—The U.S. has agreed to sell up to 1,100 lb. of fissionable atomic fuel to Australia for atomic power plants and for experimental work on nuclear reactor parts. This agreement will last for ten years. It has been described as the first allocation from the 44,000 lb. of atomic fuel offered by President Eisenhower for sale to foreign nations. Under the agreement, the first since those signed with the U.K. and Canada last year, the U.S. will assist in the development of Australia's atomic programme. Safeguards are called for which prevent the use of the fuel for anything but peaceful purposes. The sale of 88 lb. of fissionable fuel under similar terms to France had previously been announced.

The cost of natural uranium as a fuel may be reduced considerably as a result of experiments conducted by the civilian atomic power department of the Canadian General Electric Co. Dr. I. N. McKay told the American Society of Mechanical Engineers in Montreal that alloys of aluminium and nickel were being developed in place of zircoloy, now used for sheathing uranium. Fumed uranium oxide is being studied as a substitute for uranium metal and in large quantities may cost much less than the pure metal. The Japanese government technology board claims to have succeeded in an experiment to produce high purity uranium by an electrolysis method. using fused salt. The experiment cost less than 2,000 yen (about $5.50) for each kg. of uranium metal produced. It is evident that reductions in the cost of uranium as a fuel must favourably affect the long-term outlook for producers, both by contributing towards the more economical production of nuclear power and by strengthening the position of uranium itself *vis-à-vis* other potential competitors

According to Mr. Jesse C. Johnson, Director of the Division of Raw Materials, U.S. Atomic Energy Commission, production of uranium by free nations should exceed 30,000 tons of U_3O_8 annually upon completion of the projects currently under way. Known ore reserves now exceed 30,000,000 tons, with potential reserves estimated at about another 30,000,000 tons. Mr. Johnson told the Conference on Uranium and the Atomic Industry that, despite the large expansion schemes under way in Canada and South Africa, during the next five years domestic production would continue to provide a large portion of the total U.S. uranium supply. "Beyond that period," he stated, "our position as a world producer will depend largely on the domestic and foreign developments and on the world market for uranium."

The London Metal Market

(From Our Metal Exchange Correspondent)

The copper market has been more stable during the past week than it has been for a very long time, and this in spite of quite a lot of news affecting the supply situation. The wage agreements in the U.S. reported in the last article have been confirmed, and it only remains for Kennecott to fall in line for the way to be clear for an adjustment in the American domestic quotation. In Rhodesia the situation is still disturbed, a general strike last week-end which should have been followed by a complete return to work being followed on Tuesday by trouble at one mine over the wearing of leg-guards by native workers.

In Chile also there has been reported a stoppage due to a strike of drivers, and it is not clear whether this is likely to spread or not. The market has also had to cope with rumours of impending releases of metal by the U.K. government and a very small trade demand. The contango has widened again following the appreciable rise in stocks published on Monday, but it is to be repeated that it cannot yet be assumed that a backwardation is a thing of the past.

The tendency in the tin market has been a little weaker with demand remaining very patchy. It is expected that the International Tin Agreement will come into operation on July 1, but it is difficult to see how this can have any immediate effect on the market which is more intently watching developments in connection with the supply of concentrates to the Texas smelter. On Thursday morning the Eastern price was equivalent to £761½ per ton c.i.f. Europe.

The lead and zinc markets have been steady and featureless, although news that the Australian Council of Trade Unions is to step up its campaign for a higher basic wage caused some talk about possible interruptions in shipments from Australia later in the year. The developments in the negotiations in the steel trade in America are still being watched as any strike action there will materially affect the demand for zinc, and it is by no means certain that the zinc price could be held if a strike in the steel industry continued for any appreciable time.

Closing prices and turnovers are given in the following table :—

	June 21		June 28	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£293½	£294	£283	£285
Three months	£295	£296	£287½	£288
Settlement	£294		£285	
Week's turnover	6,125 tons		4,150 tons	
Tin				
Cash	£755	£756	£742	£744
Three months	£745	£746	£738	£739
Settlement	£756		£744	
Week's turnover	560 tons		965 tons	
Lead				
Current half month	£113½	£114	£112½	£112½
Three months	£112	£112½	£110½	£110½
Week's turnover	3,125 tons		2,775 tons	
Zinc				
Current half month	£94	£94½	£92	£92½
Three months	£92½	£93	£90½	£91
Week's turnover	3,925 tons		3,825 tons	

OTHER LONDON PRICES — JUNE 28

METALS

Aluminium, 99.5%, £189 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth
(min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 250s. 2½d.
Iridium, £29/31 oz.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £34/£35 oz. Imported £37 0s./£38 0s. oz.
Rhodium, £42.
Ruthenium, £15/£17 oz.
Quicksilver, £86/£86 10s. ex-warehouse
Selenium, 112s. nom. per lb.
Silver, 78½d. f.oz. spot and 78¾ f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	30% 5s. 3d. c.i.f. 20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£15 15s. 0d. per ton c.i.f.
,, Refractory 45%	£14 15s. 0d. per ton c.i.f.
,, Smalls 42%	£12 15s. 0d. per ton c.i.f.
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite, Raw (ground)	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%)	260s.0d./265s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.)	21s. 0d. nom. per lb. (home)
Ferro-tungsten (80%-85%)	18s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots	£39 3s. 9d. d/d per ton
Ferro-manganese, home	£66 per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight	103d./105d. per unit c.i.f.
Manganese Ore(43%-45%)	97d./98d. per unit c.i.f.
Manganese Ore (38%/40%)	90d./92d. per unit
Brass Wire	2s. 11½d. per lb. basis
Brass Tubes, solid drawn	2s. 4½d. per lb. basis

COMPANY NEWS AND VIEWS

Interest Maintained in Gold Shares

Under the influence of a growing conviction that a new wages contract for the U.S. steel industry might be concluded before the deadline on Saturday midnight, and thus avert a strike, Wall Street resumed its rally during the past week. An increased volume of business was evident, *The Dow Jones Industrial Index*, which on June 21 was no more than 488.26 had, by June 27, made the substantial gain to 492.04—a point which represents its highest level for the current movement.

London had to contend with a higher treasury bill rate and considerable pressure on the £ sterling which was, however, said to reflect commercial transactions rather than lack of confidence in the U.K. Additional factors were adverse news regarding redundancy in the motor industry and reports of further import cuts by Australia. Markets, therefore, remained dull during the week and whereas on June 21, *The Financial Times Industrial Ordinary Index* was 177.5, it had, by June 27 made no further headway than to move up to 178.2.

A major influence affecting the Kaffir market was Mr. Strijdom's speech at the South African Club dinner held earlier in the week. As his attitude was towards attracting British investment rather than frightening it away the speech was well received. But although the Kaffir revival continued—*The Gold Index* rising to 82 from 80.5—prices finished below the best. Yet in face of a contraction in business, quotations held up well, thus disclosing a technically sound market position. As buying for the new account (which takes in the June monthly reports as well as the June quarterlies) is expected to get into its stride from next Monday, a resumption in the upward movement is anticipated. At present it appears that markets largely reflect professional dealing, but it is thought that dull industrial markets may cause public interest to grow. An encouraging feature was provided by the price of gold which reached 250s. 2½d., the highest for over six months.

Outstanding amongst financials was Anglo American which made a gain of 9s. to around £8. Ofsits were also a strong market, rising to 61s. 3d., their highest level since March 6.

Kaffir Cost Curve Flattening

At the annual meeting of the Transvaal and Orange Free State Mines held on June 25 in Johannesburg, the president, Mr. B. L. Bernstein, ranged over the whole field of the South African gold mining industry. His remarks on the capital market and other matters relating to the inflow of funds to South Africa are dealt with in this issue under "Notes and Comments."

But perhaps of more specific interest to shareholders were his statements concerning the industry's cost structure, labour position, and the effect of the recent tax concessions.

On the question of mining costs Mr. Bernstein pointed out that while the average milling costs per ton of ore had risen steadily over the past decade, the rate of increase in 1955 of 1s. 9d. a ton which compares wih a rate of increase of the order of 2s. 4d. per ton in the preceding five years was an indication that the inflationary curve may be flattening.

An important factor contributing to this effect, he believed, was the strenuous efforts the industry had made to increase efficiencies. Indeed, work done last year compared with work done in 1946, based on the same criteria, would have required an additional 35,500 natives. The native labour position had, as has so often been reported in these columns, shown a marked improvement over the last eighteen months due, he believed, to better native working conditions and also to the good relations existing in the industry between mine managements and their native labourers.

With regard to the tax concessions granted the gold mining industry by the government in March last which included a slight reduction in the formula tax; an increased allowance in respect of all renewals and replacements of mining equipment; and, an allowance for new deep level mines he wanted it

LONDON STOCK EXCHANGE PRICES — JUNE 21 - JUNE 27, 1956

Finance	Price June 27	+ or — on week
African & European	2¼	+⅛
Anglo American Corpn.	8	+⅛
Anglo-French	21/3	+2/6
Anglo Transvaal Consol.	1¼xd	.....
Central Mining (£1 shrs.)	47/3	—6d
Consolidated Goldfields	56/3xd	+2/6
Consol Mines Selection	1 7/16	.....
East Rand Consols	2/3	+3d
General Mining	3⅛	+1/16
H.E. Prop.	7/7½	+3d
Johnnies	38/6	+1/6
Rand Mines	3¼xd	+⅛
Rand Selection	1 1/16	.....
Union Corporation	38/6	+3d
Vereeniging Estates	4 1/16 xd	—⅛
Writs	35/7½ xd	+7½d
West Wits.	37/-xd	+2/3
Rand Gold		
Blyvoor	22/3xd	+1½d
Brakpan	6/3xd	+3d
Buffelsfontein	25/4½	+3d
City Deep	10/9	+3d
Consol. Main Reef	16/10½ xd	.....
Crown	1 1/16 xd	+⅛
Daggas	2 1/16 xd	+1/16
Dominion Reefs	18/3xd	—6d
Doornfontein	21/9	+1/-
Durban Deep	24/4½ xd	—7½d
E. Champs	3/-	+3d
E. Daggas	9/3xd	+9d
E. Geduld (4s. units)	29/6xd	.....
E. Rand Props.	48/6xd	+1/6
Geduld	3 1/16 xd	—⅛
Govt. Areas	3/10½ xd	+3d
Grootvlei	19/4½ xd	—3d
Hartebeestfontein	38/9xd	.....
Libanon	7/-xd	+3d
Luipaards Vlei	14/3xd	+1/3
Marievale	20/4½ xd	+6d
New Kleinfontein	4/1½	.....
New Pioneer	14/9	+9d
Randfontein	41/-xd	+1/6
Robinson Deep	8/-xd	+3d
Rose Deep	10/6	.....
Simmer & Jack	3/9xd	+1½d
S.A. Lands	21/3xd	+7½d
Springs	2/7½xd	.....
Stilfontein	24/9xd	+1/-
Sub Nigel	28/1½ xd	.....
Vaal Reefs	33/3	+2/3
Van Dyk	2/6	+6d
Venterspost	13/4½ xd	+1/1½
Vlakfontein	17/1½ xd	.....
Vogelstruisbult	17/6xd	+1/-
West Driefontein	5 1/16 xd	+⅛

Rand Gold contd.	Price June 27	+ or — on week
W. Rand Consolidated	1 1/32 xd	+⅛
Western Reefs	1 1/32 xd	+⅛
O.F.S. Gold		
Freddies	7/3	.....
Freddies Consolidated	4/3	—1½d
F.S. Geduld	4 1/16	—⅛
Geoffries	8/6	—3d
Harmony	25/3	+1/-
Loraine	6/4½	+7½d
Lydenburg Estates	18/-	+6d
Merriespruit	8/9	+9d
Middle Wits.	13/3	+9d
Ofsits	59/9	+1/6
President Brand	59/3	+2/9
President Steyn	31/3	+6d
St. Helena	27/6	+1/3
Virginia Ord.	10/7½	—1½d
Welkom	21/-	+7½d
Western Holdings	3 1/32	+1/16
West African Gold		
Amalgamated Banket	1/6	.....
Ariston	4/4½	.....
Ashanti	16/1½	+1½d
Bibiani	2/3	+1½d
Bremang	1/3	.....
G.C. Main Reef	1/7½	.....
Konongo	1/10½	+1½d
Marlu	2d	.....
Taquah	1/7½	.....
Western Selection	7/10½	.....
Australian Gold		
Gold Mines of Kalgoorlie	12/9	.....
Great Boulder Prop.	11/9	.....
Lake View & Star	15/10½	—4½d
Mount Morgan	21/-	.....
North Kalgurli	6/6	—1/3
Sons of Gwalia	3/-	.....
Western Mining	9/7½	—3d
Miscellaneous Gold		
Cam & Motor	8/-xd	.....
Champion Reef	6/7½	+4½d
Falcon Mines	8/-	+3d
Globe & Phoenix	27/9xd	+6d
Motapa	10½d	—1½d
Mysore	3/7½	+4½d
Nundydroog	10/3	+7½d
St. John d'el Rey	21/6	.....
Zams	2 1/16	+⅛

Diamonds and Platinum	Price June 27	+ or — on week
Anglo American Inv.	8 1/16 xd	+⅛
Casts	23/7½	+3d
Cons. of S.W.A Pref.	10/6xd	—1½d
De Beers Defd. Reg.	5 1/16	+⅛
De Beers Pfd. Reg.	13½xd	+⅛
Pots Platinum	12/10½	+7½d
Waterval	21/3	+1/-
Copper		
Bancroft	42/-	+9d
Chartered	68/6	+2/9
Esperanza	3/6	+1½d
Messina	8 1/16	+⅛
Nchanga	14 1/16	+⅛
Rhod-Anglo-American	5 1/16	+⅛
Rhod. Katanga	26/9	+1/9
Rhodesian Selection	46/3	+6d
Rhokana	38	+1
Rio Tinto Reg.	2 1/16	+⅛
Roan Antelope	25/-	—3d
Selection Trust	4 1/32 xd	+1/32
Tanks	7 1/16	+⅛
Tharsis Sulphur Br.	4¼	.....
Tin (Eastern)		
Ayer Hitam	20/6xd	—3d
Gopeng	9/9xd	+4½d
Hongkong	5/7½	.....
Ipoh	23/6	.....
Kamunting	8/-	+1½d
Kepong Dredging	2/9	.....
Kinta Tin Mines	15/9	.....
Malayan Dredging	8/10½ xd	.....
Pahang	11/6	.....
Pengkalen	13/3	+9d
Petaling	7/10½	.....
Rambutan	24/6	.....
Siamese Tin	10/-	—9d
Southern Kinta	15/-	—3d
S. Malayan	7/3xd	—3d
S. Tronoh	5/9xd	.....
Sungei Kinta	15/-	+6d
Tekka Taiping	10/1½	+6d
Tronoh	9/1½xd	—1½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/4½	—4½d
Beralt Tin	46/-	.....
Bisichi	4/4½	—1½d
British Tin Inv.	22/9	+1/-
Ex-Lands Nigeria	2/3	—1½d
Geevor Tin	15/3	+9d

Tin (Nigerian and Miscellaneous) contd.	Price June 27	+ or — on week
Gold & Base Metal	1/6	.....
Jantar Nigeria	4/7½	—3d
Jos Tin Area	12/3	.....
Kaduna Prospectors	1/6	.....
Kaduna Syndicate	2/3	+1½d
London Tin	9/3	+1½d
United Tin	10½d	.....
Silver, Lead, Zinc		
Broken Hill South	56/3	+1/3
Burma Mines	5/10½	4½d—
Consol. Zinc	49/6	.....
Lake George	14/-	+3d
Mount Isa	19/3	+1½d
New Broken Hill	41/-	+1/-
North Broken Hill	4 1/16	+⅛
Rhodesian Broken Hill	10/7½	+1½d
San Francisco Mines	23/9	.....
Uruwira	4/9	.....
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	45/3	+3d
Associated Manganese	36/-xd	—7½d
Cape Asbestos	9/-	—1½d
C.P. Manganese	28/3	+6d
Consol. Murchison	2 1/16 xd	.....
Natal Navigation	3 1/16	—⅛
Turner & Newall	101/3	+7½d
Wankie	17/3	—3d
Witbank Colliery	4 1/32	—⅛
Canadian Mines		
Dome	$26	—1
Hollinger	$49	+½
Hudson Bay Mining	$157	+4
International Nickel	$175½	+6½
Mining Corpn. of Canada	£9 1/16	+⅛
Noranda	$109	+3
Quemont	£9½	—½
Yukon	4/6	.....
Oil		
Apex	38/6xd	.....
Attock	40/-	+6d
Br. Petroleum	180/7½	+23/10½
Burmah	110/7½	+15/-
Canadian Eagle	63/-	+4/3
Mexican Eagle	20/9	+3d
Shell	9 1/32	+1/32
Trinidad Oil	75/6	+6d
T.P.D.	45/3	+1/6
Ultramar	40/10½	+7½d

made clear to shareholders that however welcome these were the material effect of the concessions was not great when viewed against the problems confronting the industry.

Connection Made Between F.S. Geduld and W. Holdings

The 43 Level Haulage South from Free State Geduld No. 2 Shaft has been connected with the 41 Level Haulage north from Western Holdings' No. 1 Shaft. The holing was made in country rock at a point approximately 3,800 ft. south-west of F.S. Geduld No. 2 Shaft, and 1,800 ft. north of the Western Holdings boundary.

A connection has also been effected between the 53 Haulage North from F.S. Geduld No. 1 Shaft and a drive south from its No. 3 Shaft. The latter shaft, it will be recalled, was acquired from Freddies Consolidated Mines in 1955.

General Mining Considers Raising New Money

Speaking at the meeting of General Mining and Finance Corporation, Sir George Albu, the chairman, stated that the lower level of market activity had resulted in financing difficulties for new ventures and expansion programmes. But the gold mining industry had, so far, succeeded in finding the necessary funds. Insofar as the Corporation was concerned, however, resources were fully employed and consideration would have to be given to the provision of funds to meet commitments which had been undertaken. Sir George's speech to shareholders will be found on page 816 of this issue.

Progress of Crosscut from Loraine to Riebeeck

At the meeting of General Exploration Orange Free State, Sir George Albu, the chairman, reported that on June 23 the twin crosscut from Loraine into the Riebeeck property had advanced 1,586 ft. and was approximately 4,800 ft. from borehole K.1 on the farm Kromdraai No. 386. He also disclosed that two hoists together with winding equipment had been purchased.

Gopeng Maintains High Production Rate

Although the volume of ground treated by Gopeng Consolidated during twelve months ended September 30, 1955 was a little less than that of the previous year, the grade recovered was substantially higher. This was responsible for a considerably increased output of tin ore.

Year to Sept. 30	*Ground treated* (*cu. yd.*)	*Output tin ore* (*tons*)	*Per Cubic Recovery* (*lb.*)	*Yard Cost* *d.*	*Price recd.* (*per ton*) £
1955	1,989,900	758·73	·85	16·79	430
1954	2,181,400	563·33	·57	12·60	419

Note : During 1954-55 tributers' ore sales totalled 264.57 tons and yielded a net revenue of £11,864.

Moreover this improvement in production has continued into the current year and a total of 407 tons of tin ore have been recovered during six months ended March 31 compared with only 373¼ tons in the previous corresponding period. So far, the company has paid two interim dividends of 10 per cent on its issued ordinary capital of £395,768 in 5s ordinary stock units. Distribution totalling 50 per cent in 1954-55 was made up of two interims of 5 per cent, two of 10 per cent, and one of 20 per cent. It should be remembered, however, that the last mentioned 50 per cent payment was made possible by a settlement of tax claims.

At their present price of around 10s. Gopeng Consolidated 5s. stock units yield 25 per cent. Mr. Donald W. Thomas is chairman. Meeting, Redruth, Cornwall, July 3.

Tekka-Taiping's Output Recovers

As previously forecast by Mr. Donald W. Thomas, chairman of Tekka-Taiping, the company's dredge was compelled during the year ended October 31, 1955, to follow a course over ground containing low values. It was, therefore, no surprise that the total output of tin ore decreased considerably compared with the preceding twelve months.

Year to Oct. 31	*Ground treated* (*cu. yd.*)	*Output tin ore* (*tons*)	*Per Cubic Recovery* (*lb.*)	*Yard Cost* (*d.*)	*Price recd. per ton* (£)
1955	1,953,500	221·94	·25	10·76	429
1954	2,390,100	379·54	·36	8·38	409

Towards the end of 1955, however, it was decided to move the dredge at flotation depth towards an area of ground in which bores had indicated the presence of higher grade ore. As this area was approached outputs improved, although returns for the five months ended March 31, 1956, showed that only 37½ tons had been produced against 109¼ tons during the previous corresponding period. It was not, in fact, until April, 1956, that the really spectacular gain to 37½ tons (against a monthly average of about 20 tons for the first months of 1956) was made. And it is encouraging that this rate of output is expected to continue for some time to come.

At a meeting held last February a proposal to make a capital return of 5s. per £1 share was passed by members of the company. As court sanction has now been received for this, the company's issued ordinary capital will soon be reduced to £299,985 in 15s. shares. Meanwhile the £1 units at present stand at about 10s. compared with a low point of 8s. 6d. this year.

Pengkalen's High Current Production Rate

Dredging difficulties were experienced by Pengkalen during the latter two months of its past financial year ended September 30, 1955. This was due to a heavy subsidence of ground at an adjacent opencast mine which resulted in a decrease in the total volume of ground treated. A lower grade of ore recovered also contributed to the much reduced output total.

Year to Sep. 30	*Ground treated* (*cu. yd.*)	*Output tin ore* (*tons*)	*Per Cubic Recovery* (*lb.*)	*Yard Cost* (*d.*)	*Price recd. per ton* (£)
1955	1,747,800	420.87	.53	12.00	432
1954	1,983,900	536.06	.60	11.42	411

As forecast, production by the company during the first six months of its current financial year at 308½ tons has shown a considerable improvement over the amount of 235½ tons obtained during the corresponding period of 1954-55. Indeed, if this level is to be continued throughout the current year, output has the chance of reaching a postwar record.

During the past financial year Pengkalen made net profits after depreciation and expenses of £108,316 (£131,048). After taxation of £65,626 (£78,603), and dividends amounting to 50 per cent (30 per cent) on the issued ordinary capital of £90,000 in shares of 5s. which absorbed £25,763 (£14,738), unappropriated profits carried forward declined to £60,991 from £61,614. The balance sheet at September 30 showed total assets at £499,984 compared with £497,851 previously. As fixed assets remained unchanged at £50,000 this expansion was entirely due to a rise in current assets to £449,984 from £429,851.

So far, the company has declared interims of 10 per cent and 25 per cent (5 per cent and 15 per cent) in respect of the year ending September 30, 1956. It thus appears possible that a higher level of distribution might be reached this year.

At their present price of around 13s. Pengkalen 5s. ordinary shares yield over 19 per cent. Mr. D. W. Thomas is chairman. Meeting, Redruth, Cornwall, July 3.

Jantar Passes Interim

It has been announced by Jantar Nigeria that results for six months ended March 31, 1956, do not warrant the declaration of an interim dividend in respect of the year ending September 30, 1956. During 1954-55 an interim distribution of 20 per cent was made on the issued ordinary capital of £225,000 in stock units of 2s. 6d. This was followed by a final of 40 per cent. Mr. C. A. P. Tarbutt is chairman and managing director.

Ex-Lands Earns More But Pays Less

With the recommendation of a dividend of 15 per cent on its issued ordinary capital of £200,000 in 2s. stock units for the year ended December 31, 1955, Ex-Lands Nigeria's distribution has been reduced by 5 per cent from that of the previous year.

Net profits after taxation earned by the company were slightly increased at £31,173 from the previous figure of £26,453. Dividends absorb £23,949 (£31,522) leaving a credit balance to be carried forward of £47,931 compared with £40,707. Major-General W. W. Richards is chairman.

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Siamese Tin to Pay 20 Per Cent Final: Also Interim 7½ Per Cent

With the recommendation of a final dividend amounting to 20 per cent on its issued ordinary capital of £546,400, Siamese Tin Syndicate's total distribution for the year ended December 31, 1955, has totalled 45 per cent. This compares with only 30 per cent for the preceding year.

Preliminary figures for the past financial year show a striking increase in net profits, after taxation, to £215,078 from £122,031. Dividends absorb £141,381 (£92,888) and balances carried forward of £60,041 compare with £62,936 at the end of the previous year. Preliminary figures from the group consolidated balance sheet reveal fixed assets up at £622,011 from £507,275. On the other hand net current assets declined to approximately £816,000 from £942,000. In explanation of these changes, shareholders are reminded of the recent purchases of Renong Consolidated Tin Dredging, Katu Tin Dredging and Burma-Malay Tin. In addition, further expenditure was incurred on the Lowland Lead Mines project.

Siamese Tin Syndicate has also recommended a first interim dividend of 7½ per cent (5 per cent) for the current financial year ending December 31, 1956.

Mr. R. S. G. Scott is chairman. Meeting, London, July 23.

GENERAL MINING AND FINANCE CORPORATION LIMITED

(Incorporated in the Union of South Africa)

SUMMARY OF CHAIRMAN'S ADDRESS TO SHAREHOLDERS

At the Annual General Meeting held on June 26, 1956, the Chairman, in the course of his address to shareholders said that the year to December 31, 1955, was the first full year following the merger of Strathmore Consolidated Investments Limited with the Corporation. For the first time net revenue from dividends on investments from supervision of Companies and from other sources had exceeded £1,000,000 but profits on share transactions had been negligible. This was not dissimilar to the experience of some other Mining and Financial Houses in Johannesburg, and might be attributed to an inactive stock market, for which there had been many reasons not arising solely from conditions within the Union. The Bank Rates, both in the United Kingdom and in South Africa, had been raised during the year and other restrictive financial measures had been adopted, with the result that the volume of capital circulating had declined, noticeably in the gold share market.

At the end of the year it had been necessary to write down certain of the Corporation's quoted investments because of the decline in market prices, and also to provide for reductions in the estimated values of some of the unquoted investments. In all £540,000 had been provided, £475,000 from Reserves and the balance of £65,000 from profits for the year. The market value of quoted investments at the close of the year, as shown in the Consolidated Balance Sheet, was in excess of £13,700,000 while in the opinion of the Directors the aggregate value of the unquoted investments was substantially in excess of their book value. The ordinary dividend had been maintained at 5s. per share.

The low level of activity in the market had resulted in difficulties in the finance of new ventures and expansion programmes, but so far the gold mining industry had succeeded in finding the necessary funds. In so far as the Corporation was concerned the Accounts disclosed that its resources were fully employed and consideration would have to be given to the provision of funds to meet the commitments which had been undertaken.

As the President of the Chamber of Mines had said the previous day, the importance of an inflow of capital into the country could not be over-stressed and conditions attractive to foreign investors included freedom of movement of capital and absence of any hint of control. The imposition of controls was never an inducement to confidence and it was to be hoped that such measures would be relaxed as soon as possible and that nothing would be done to hamper the inflow of capital.

The Gold Mining Industry was peculiarly placed in world affairs as the price of its product was not subject to the laws of supply and demand, but was governed by statutory actions and by International agreements. In inflationary circumstances it followed that gold mining was the most adversely affected of all mining activities, but there were signs that the tempo of expansion throughout the world was reaching a stage where a period of consolidation would set in. If that trend continued, a lowering of commodity prices could be expected, which in turn would mean a reduction in mining costs, but not accompanied by a fall in the price of gold.

Some of the older mines on the Witwatersrand were experiencing difficulty in operating at a profit, and the attention of the Union Government had been drawn to the problem. New legislation had been introduced increasing the benefits provided under the Silicosis Act, part of the cost of the improvements being borne by the Government. The formula tax, applicable to the taxation of gold mines, had been reduced and it was estimated that the relief to the Industry would total £700,000. These two actions were very much appreciated as showing the desire of the Government to assist the Industry where possible.

There were many new mines either reaching production or increasing their capacities, and the foreign currency which would become available to the Union through the sale of gold and uranium should steadily increase.

The major mining interests acquired by the Corporation as a result of the amalgamation with Strathmore, were Stilfontein and Buffelsfontein. Stilfontein had reached the dividend paying stage but was still increasing the capacity of its reduction plant. Development had commenced at Buffelsfontein and was highly satisfactory. The Corporation could look forward to increasing dividend income from these two sources.

It had been necessary to reassess the value of the Ellaton Gold Mining Company, which had been considered to have good prospects at the time of the amalgamation, but adverse factors had indicated a serious reduction in the life of that mine. Provision had been made in the Corporation's Accounts against possible losses.

The West Rand Consolidated Mines continue to be one of the Corporation's main sources of income. Operations were mainly directed towards the production of uranium under an agreement current until 31st December, 1964, but he was not in a position to discuss the possibility of the agreement being extended. By that time the South African uranium producers might well be favourably placed to compete in world uranium markets, especially as the loans obtained for the erection of the uranium plants would have been fully repaid and the plants thus fully amortised.

At South Roodeport Main Reef Areas, operations continued to be very satisfactory. Dividends declared during 1955 had been increased by 3d. to a total of 1s. 9d. per share, and the dividend declared in June, 1956, had been further increased by 3d. per share over the dividend declared twelve months previously.

The Chairman was able to inform shareholders that approval had been given earlier that morning at a meeting of stockholders of General Exploration Orange Free State Limited, to an agreement for the cession to Riebeeck Gold Mining Company Limited of mineral rights held respectively by General Exploration Orange Free State Limited and Middle Witwatersrand (Western) Areas Limited in the van den Heeversrust area of the Orange Free State.

The Riebeeck Company would apply for a mining lease over an area of approximately 2,415 claims. Very encouraging results had been obtained in the course of an extensive drilling programme, particularly in a series of Upper Reefs which had not yet been found to exist elsewhere in the Orange Free State goldfields. In the opinion of the Directors, the Riebeeck Gold Mining Company would be an attractive mining venture, and the arrangements made provision for the possibility of two separate Mining Companies to work on a lateral division of reefs. Twin crosscuts would be driven by Loraine Gold Mines Limited from their No. 2 Shaft towards the proposed lease area, and the Chairman was looking forward with great interest to the detailed information which would become available as development proceeded.

The Corporation had substantial interests in a number of other mines in the Orange Free State and dividend income was bound to improve as those Companies proceeded towards their contemplated full production programmes. The Corporation was also interested in copper, platinum and coal and in industrial interests.

The Chairman referred to the commencement of excavations for the new building at the corner of Main and Hollard Streets. He also thanked Messrs. P. H. Anderson and W. M. Frames for their services to the Corporation whilst members of the Board.

Copies of the full speech may be obtained on application to the London Office.

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THE ZAMBESIA EXPLORING COMPANY LIMITED

The Annual General Meeting of The Zambesia Exploring Company, Limited, was held on June 27, 1956, at The Chartered Insurance Institute, E.C.2. **Capt. Rt. Hon. Charles Waterhouse, P.C., M.C., D.L., M.P.** (Chairman) presided.

The Chairman's Review, circulated with the Report and Accounts, stated that the profit before taxation for the year ended March 31, 1956, was £68,820 for the parent Company and £121,665 for its wholly-owned subsidiary, The Zambesia Investment Company, Limited, making a total of £190,485. After providing for current taxation, allowing for adjustment of taxation of previous years, transferring the sum of £50,000 from General Reserve, and bringing into account the balance brought forward, a balance of £119,872 remained available for appropriation in the Parent Company. An interim dividend of 4% less tax had been paid, and provision made for a final dividend of 13½% less tax, making a total of 17½% for the year. The profit of the subsidiary Company after taxation, which amounted to £63,933, had not been distributed but had been added to the balance carried forward, which had been increased thereby to £226,715. The total reserves of the parent and subsidiary companies taken together had increased from £557,661 to £605,832.

£45,429 of the unissued share capital had been offered to stockholders at par in the proportion of one new share for every complete £20 of Ordinary Stock held at April 27, 1956. Any shares not applied for, and all fractions of shares, would be sold on the market and the difference between the issue price of par and the net sale price paid over to stockholders entitled thereto. The proceeds of the issue would assist the Company to play its part in the development of Central Africa.

The profit of The Zambesia Investment Company Limited, after provision for taxation of past and current years, was £63,933.

For the benefit of Stockholders, the latest published information relating to the Companies in which you hold substantial interests is given below:—

TANGANYIKA CONCESSIONS LIMITED. The principal assets of Tanganyika Concessions Limited consist of shares and debentures in the Union Minière du Haut Katanga and Benguela Railway Company. After providing for taxation, the consolidated results of Tanganyika Concessions Limited for the year ended July 31, 1955, show a profit of £3,008,830.

UNION MINIERE DU HAUT KATANGA. Mining extraction during the year 1954 amounted to 7,438,000 metric tons of ore of various kinds, including copper, cobalt, zinc and uranium ores. The output of copper (223,791 metric tons) and cobalt (8,609 metric tons) improved once more on the records created in the previous year.

BENGUELA RAILWAY COMPANY. The Benguela Railway Company had a net revenue of Escudos 127,163,194 (£1,579,667) for the year 1954, thus regaining the ground lost in the previous year, when a net revenue of Escudos 77,368,410 (£961,098) was recorded.

TANGANYIKA HOLDINGS LIMITED. The main interests of Tanganyika Holdings Limited comprise: Shareholdings in Rhodesia-Katanaga Company Limited and Kansanshi Copper Mining Company Limited (in which a direct interest of 6.61 per cent is held) a participation of 30 per cent in the exploration activities of Rio Tinto Finance and Exploration Limited in Northern Rhodesia; and a substantial shareholding in Kentan Gold Areas Limited.

RHODESIA-KATANGA COMPANY LIMITED. Rhodesia-Katanga Company Limited owns 35.24 per cent of the issued share capital of Kansanshi Copper Mining Company Limited. The Anglo American Corporation of South Africa Limited, who are also substantial shareholders, are pursuing as Consulting Engineers a programme to equip the mine to concentrate 12,000 tons of sulphide ore per month. Good progress is being made, and milling is expected to commence in the last quarter of 1956. The problems of de-watering the mine are being successfully overcome, and development results to date are not unpromising. Rhodesia-Katanga Company Limited also owns, subject to 15 per cent interest of the British South Africa Company, perpetual coal-mining rights in 20 areas of 300 acres each and a perpetual mineral rights over an area of about 2,500 square miles, situated in Northern Rhodesia between Broken Hill and the Loangwa River.

KENTAN GOLD AREAS LIMITED AND GEITA GOLD MINING COMPANY LIMITED. The principal asset of Kentan Gold Areas Limited consists of its holding of 78.63 per cent of the issued capital of the Geita Gold Mining Company Limited, a private Company incorporated in Tanganyika Territory.

The report and accounts were adopted.

SITUATION VACANT: Mine Surveyor, single not over 45 years, for mining company in Tanganyika—excellent opportunities for advancement—applications in writing giving age, experience, education and nationality to Mine's Agents, Leopold Walford Shipping Ltd., Ref. Order Dept., 48-50 St. Mary Axe, London, E.C.3.

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Further particulars and application form will be sent by the undersigned. Last date for receipt of applications: Monday, July 16, 1956.

E. C. SMITH,
Principal.

June 22, 1956.

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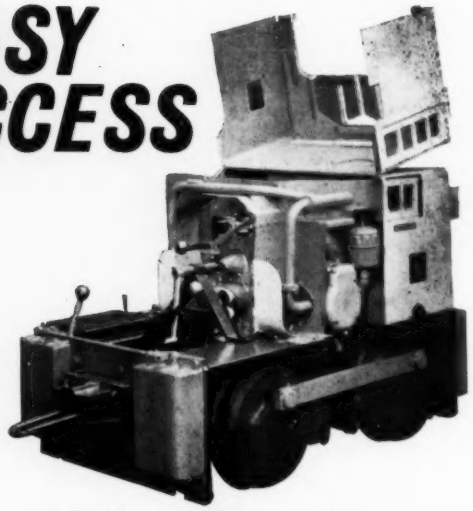

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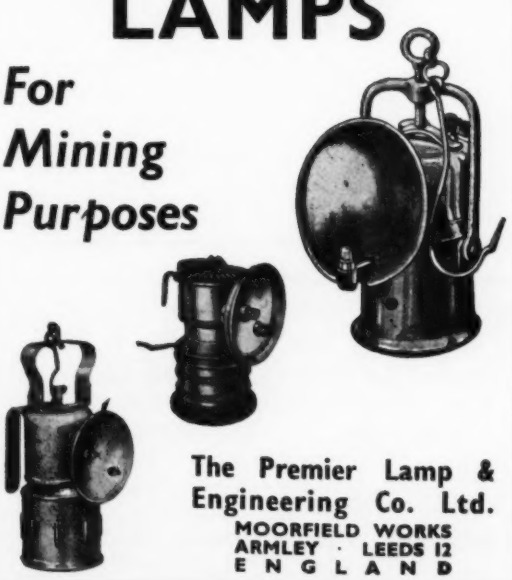

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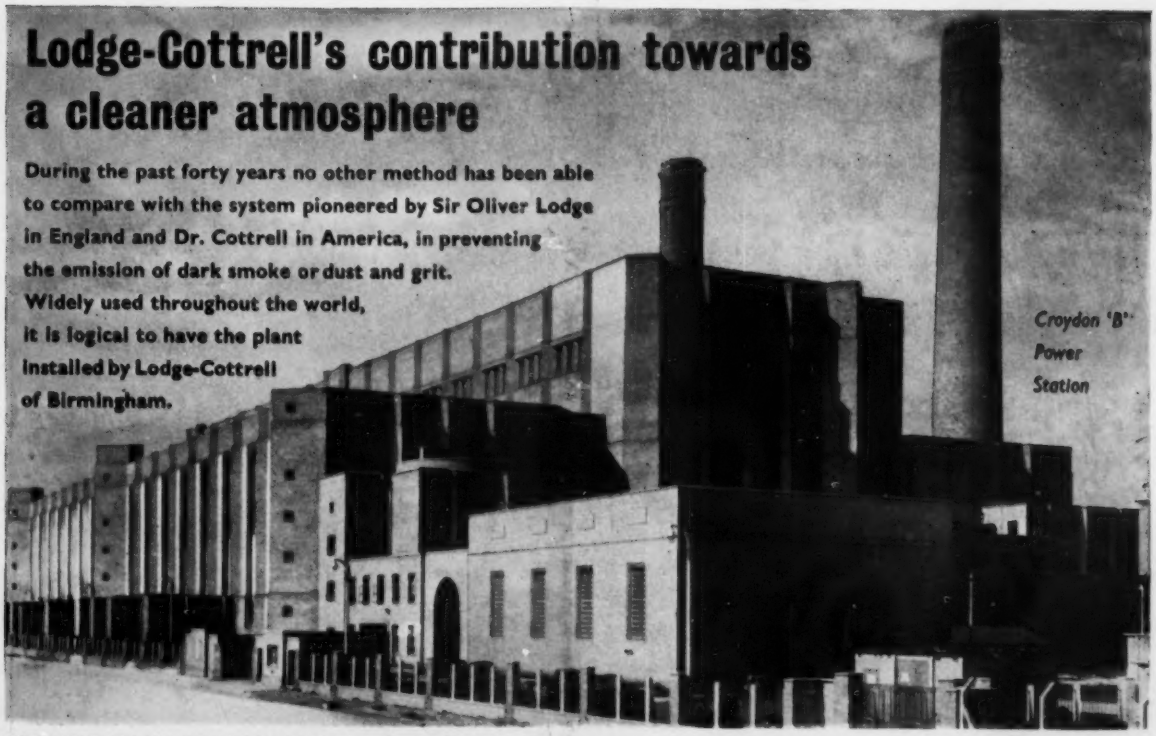

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